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THESIS

BATTLE GROUP ASSET MANAGEMENT
DECISION SUPPORT SYSTEM

by

Charles S. Vogan, Jr.

March 1984

Thesis Advisor: Gary K. Poock

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SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO. / 3. RECIPIENT'S CATALOG NUMBER
4. TITLE *(and Subtitle)*: Battle Group Asset Management Decision Support System	5. TYPE OF REPORT & PERIOD COVERED: Master's Thesis; March 1984
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR*(s)*: Charles S. Vogan, Jr.	8. CONTRACT OR GRANT NUMBER*(s)*
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Naval Postgraduate School, Monterey, California 93943	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS: Naval Postgraduate School, Monterey, California 93943	12. REPORT DATE: March 1984
	13. NUMBER OF PAGES: 227
14. MONITORING AGENCY NAME & ADDRESS*(if different from Controlling Office)*	15. SECURITY CLASS. *(of this report)*: Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT *(of this Report)*

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

18. SUPPLEMENTARY NOTES

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

Decision Support Systems
Computer Graphics Decision Aids
Voice Recognition

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)* A battle group commander's successful employment of the assets in his battle group heavily relies on his conceptualization of the pragmatic capabilities of each of these assets. This thesis comprises an interactive decision support system (DSS), which utilizes database management and high resolution computer graphics, to assist the commander in meeting this challenge. The DSS incorporates data on specific systems installed on each unit as the basis for user developed capability effectiveness system coverage displays. The system is designed to be operated through discrete speech voice recognition equipment.

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S/N 0102-LF-014-6601

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

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Battle Group Asset Management Decision Support System

by

Charles S. Vogan, Jr.
Lieutenant Commander, United States Navy
B.S., United States Naval Academy, 1972

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN SYSTEMS TECHNOLOGY
(Command, Control and Communications)

from the

NAVAL POSTGRADUATE SCHOOL
March 1984

ABSTRACT

A battle group commander's successful employment of the assets in his battle group heavily relies on his conceptualization of the pragmatic capabilities of each of these assets. This thesis comprises an interactive decision support system (DSS), which utilizes database management and high resolution computer graphics, to assist the commander in meeting this challenge. The DSS incorporates data on specific systems installed on each unit as the basis for user developed capability effectiveness/system coverage displays. The system is designed to be operated through discrete speech voice recognition equipment.

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I. BACKGROUND AND OVERVIEW

A. ANOTHER DECISION AID !? -- A DEFENSE

> ... I never needed any computer to make a decision for me ..... our success just goes to show you don't need any of these fancy computer systems when it comes right down to brass tacks...

Six months into development of a thesis which was designing a computer based Decision Support System, this statement is somewhat provocative. Recently, this author sat in an audience captivated by the dynamic commander who was on stage. A portion of his closing remarks included the paraphrase which headed this chapter. Was the connotation of his statement more than his ego-involvement spawned by the euphoric taste of success?

The mandate of command is to make decisions when operations "come down to brass tacks." There is no such mandate for a computer system. The commander who doesn't avail himself of all sources and methods of display of information cannot be as confident of his decisions as the commander who does. The complexity of contemporary peacetime and wartime operations, in concert with technological advancements which are occuring at near exponential rates, is often times characterized by too much information to digest, however. Computer supported decision making can overwhelm and often dilute human capabilities by proliferating the volumes of knowledges which a user feels compelled to assimilate. This gives rise to a common malady in the Military, "decision aid angst."

Originally, computer systems focussed on abilities to manage massive amounts of information, a Management

Information System (MIS). More recently, the focus has shifted to translating existing technological capabilities into Decision Support Systems (DSS). The DSS channels the massive data processing capabilities of today's computer technology towards the "decision" and away from demonstrating how much data can be manipulated. DSS, in the purists' view, is an extension of the innerworkings of the commander himself. The commander has participated in its design, and it then allows him to make a comprehensive decision based on information organized for presentation in a format he desires. How the designer of the DSS defines the user-system interaction requirements as well as the format of the information display, becomes the difference between whether the power to the system is "on" throughout the decision making process, or "off," archieved for "future use."

This thesis addresses an interactive decision support system for a battle group commander, to enhance the effective management of the assets assigned to the battle group. It focusses on a realistic dialogue [Ref. 1] and substantive information representation to expand its useability and not dust collecting capability.

B. DECISION SUPPORT SYSTEMS

For a Decision Support System to have long-term utility, it must be the result of an "evolutionary " design process. This process must address both the evolution of the technology, and that of the user.

The necessary iterative design process relies on short-term feedback between the user and the developer to ensure that required change is implemented in the short term. This process applies to the three fundamental subsystems of a DSS, dialogue, data management, and model management. [Ref. 1]

This thesis addresses a specific component of a battle group commander's sphere of responsibility, asset management. It has been developed based on this author's experience in Fleet operations.[1] As the designer and user of the DSS, the precepts discussed above, fundamental to the design of a DSS, have been met. Extension of the applicability to follow-on user groups would necessitate "evolutionary" fine tuning to each group. This DSS is based on a schema of management of a capabilities database of a designed battle group, and translating that database into descriptive computer graphics displays. Control of DSS operations with respect to user-system interaction represents state of the art technology in the utilization of voice recognition protocols. With the use of voice, the user is thus free from the confines of a terminal keyboard. The system, as developed, does not represent a stand alone DSS in the complete sense discussed above. The "Model Subsystem" [Ref. 1] is manifested in the tactical knowledges of the user, and not an analytic or mathematical model. Incorporation of such a model or models is an obvious follow-on enhancement to the system. Less a model subsystem, a semantic title of "Decision Support Subsystem" may be contemplated, however, in actuality, this system does operate based on a model, the user. The "model" which this DSS utilizes, resides in the mind, experience, and fibre of a user, which has been honed throughout a career. The outgrowth of this system is an extension of the commander's "mind's eye," an interface between the conceptual and the real. In formulating the best employment of his battle group, based on the capability (sensor and weapons) of each

---

[1]The author has participated in 6 READIEX, 3 FLEETEX, and numerous other warfare exercises. This experience has included functioning as a principle watchstander for the ASWC, ASUWC, or AAWC in the majority of those operations. Additionally, the author has attended the TACTRAGRUPAC Staff Tactical Training Course.

ship in the force, this DSS allows the commander to externally visualize the interplay of capabilities among those assets.

C. DIALOGUE SUBSYSTEM DEVELOPMENT

Any system which encompasses a man-machine interaction must strive for that illusive "symbiotic" relationship where man and machine are in harmonic unison with each other. The principle stumbling block to achievement of this goal has been the format of the language which joins the two, English versus "Computerese." Additionally, the "angst" mentioned earlier can be an outgrowth of a deficiency of clerical skills on the part of the user, at the interface. The challenge is accentuated by the speed mismatches between man and machine "thinking." The issue is to construct a common language at the interface, where the goals and intentions of the user are easily translated into the logical courses of action of the computer. [Ref. 2]

Can a computer really be friendly? This question should more accurately replace "computer" with "computer software designer." Therein lies the source of many of today's misgivings. The software designer must be attuned to the real world requirements and not just code formats or primitives. If the designer looks at the man-machine environment, and accurately interprets it, then computers can indeed be "friendly." Users, by their human nature, have expectations. Therefore, a computer system should be predictable. The adversarial relationship which could develop between man and machine is eliminated when the user is given responses from the system which reinforce a confidence that the information is "shared," and not one sided. This relationship is further cultivated by the system returning positive feedback to the user when a response is

entered, a stop-gap for potential anxiety. When all these concepts are merged, the key which unlocks the puzzle points to "vocabulary." [Ref. 3]

This DSS has taken into account the vernacular of the battle group and interfaced it with the vocabulary of the computer. Going one step further, the input medium, with voice recognition, has allowed the evolution of the inputs into a conversational and not command format. Flexibility has been incorporated into the formats by allowing multiple options for each component of a conversational construct. Therefore, consistency is met while concurrently allowing flexibility to meet the user's multiple needs. Internal to the system, this practice moves one step further with commonly used conversational inputs grouped into single word inputs, when feasible.

Finally, the value of operating the system through voice control cannot be overstated. Not only does this interactive format free the user from translation of his thought processes through a keyboard, but also provides mobility throughout the work center or watch station, while maintaining control of the system. The pragmatics of the conversational interactions in this DSS, while accomodating multiple options, nearly exhausts the 256 utterance vocabulary of this discrete speech equipment (Threshold Technology's T-600). However, while the obvious extension is to convert the DSS to a connected speech technology, when properly trained, the T-600 has shown remarkable ability to discriminate utterances and handle the demand.

D. DESIGN PHILOSOPHY

There were three principle design philosophies which the author adhered to in developing this DSS. First, the system is survivable, or in another parlance, "robust."

The query/response sequences are all supported by system error checks to preclude unintentional "bombing" of the system, and reduce user apprehension. Each view which requires a user response shows examples of correct responses. The differences between the entry formats for keyboard and voice are illustrated, in detail, in the User's Manual, the third chapter of this thesis. In addition to providing as error check of the inputs, the language is simple and replicates how the user would normally articulate the parameter being addressed. Additionally, the User's Manual shows example sequences through a complete session with the system, reproducing the logical inputs and system responses, as well as error recovery features. Finally, the DSS is consistent, in that the types of entries and their respective results are identical throughout the eight modules of the system.

E. GRAPHICS -- IMPROVING PERCEPTION OF CAPABILITIES

The "acid test" of the performance of any sensor or weapons system is in actual operations. When these operations are with an adversary, whether in an exercise or real world, the preparatory thought given to the employment of those assets significantly impacts on their aggregate performance. In assimilating the huge amounts of data required to make a credible decision as to asset employment, timeliness requires the commander digest that information in "chunks." The results of numerous studies have borne out that visual perception of large amounts of information significantly increases human ability to draw inferences and make subsequent judgements. The same graphics display may represent differing interpretations to different people. However, the "evolutionary" design process of a DSS, precludes this eventuality by having had the commander

provide the input as to the design of the displays, and thereby the format of the information represented. [Ref. 4]

The graphics capabilities of this DSS reflect state of the art graphics technology. The applications programs for the displays are written utilizing the DI-3000 software language. The only shortfall of the hardware in use is that it does not allow complete filling of overlapping polygons (principally circles in this case) on the same view. This reduces the effectiveness of the overall sensor/weapons coverage displays by having multiple circles shown vice one solid area for force coverage. The bottom line, though, is that the graphics displays, regardless of this shortfall, enhance by several orders of magnitude the value to the force of radar "a" or weapon "b," in comparing their net effectiveness. This comparison is presented in relation to the other comparable systems in the force to provide a comprehensive, "net" effectiveness display.

F. ASSET MANAGEMENT DECISION SUPPORT SYSTEM

This thesis is organized into three chapters: an introduction, a discussion of the software development, and finally, a comprehensive User's Manual for operation of the system. It is essential to point out at this juncture, the design has attempted to maximize the ease with which a user interacts with the system, and therefore, the User's Manual can assume a more appropriate application as a reference rather than a mandatory prerequisite for operation.

The battle group assets addressed in this DSS are those commonly found in a carrier or surface battle group, with their supporting Service Force ships. In the interest of economy, for a carrier battle group, only fighter and AEW airwing assets are considered. The general functioning of the DSS is initiated with the input of the names of the

ships which will compcse the battle group. The ship names, in turn, are the key elements of database records, which are reflective cf that ship's senscr, weapons, and UHF/HF communicaticns capabilities. To afford maximum dissemination of not cnly this thesis, but also the DSS concept, the ship databases have been develcped from unclassified sources. However, the design of the files containing the data, readily facilitates the transition to a classified database.

The focus of this DSS is to afford the battle group commander a vehicle whereby he can "build" a battle group from specific units with their specific capabilities and not typical class capabilities. Whether it be a theoretical formaticr cf a group of representative ship types, or a composition of task crganized units, the system will crganize and display the performance capabilities of the sensors and weapons which are organic to the developed group. The operations of the DSS revolve around establishing the positions of the ships from designated "ZZ" position, then allowing the user to display to the terminal screen specified weapcns and sensor capabilities, as well as displayirg to the graphics monitor the translation cf equipment capability intc coverage or effectiveness areas for each asset. A distinction is made here, between terminal screen and graphics mcnitor, as the system can accomodate two categories cf installations; those with a graphics interface, and those without. While the design encompasses a full graphics display capability, with the terminal displays providing supplemental views, the supplemental views are ccmprehensive and can stand alone should the user have nc graphics capability. For operaticn of the DSS withcut a graphics capability, the user should refer to the introductcry sections of the User's Manual.

With the graphics capability, once the coverage areas have been displayed, the user can expand the detail of the

view by displaying a cartesian coordinate grid and/or an appropriate threat sector. Additionally, with an eye towards projecting the tactical impact of moving a unit, the user is afforded the opportunity to manipulate the positions of the force units and observe the subsequent change in force sensor or weapons coverage effectiveness.

More towards the administrative aspects of battle group operations, the Composite Warfare Commander (CWC) organization can be constructed, managed, and changed. Additionally, a real time view of the composition of the various circuits in the battle group communications plan is available. In the COMMS module of the DSS, the communications nets can be displayed with the participating units, as dictated by mission area, shown. An extension of the communications views is a comparison, on the UHF nets, of the units who are out of UHF comm range with the Net Control Station. A final administrative capability of the system is allowing the user to enter explanatory remarks for a unit, to be included in that units database for future access/display.

G. FOLLOW-ON ENHANCEMENTS

The primary goal of this thesis has been to initially develop an interactive Decision Support System, controlled through voice technology, which facilitates a battle group commander's management of his assets. There are several enhancements to this DSS which could be addressed by future efforts.

- Conversion to Connected Speech Voice Technology
- Incorporation of SHARPS and IREPS data as alternatives to the system default sensor capabilities

- Expansion of the database and display capabilities to allow display of the opposition sensors and weapons on the same view
- Conversion of the software to micro-computer/desk top use
- Adaptation of the DI-3000 "Pick" function allowing identification of monitor coordinates from a "Byte Board" device
- Incorporation of performance models which would drive the positioning of the force units
- Interface with a wargame to allow representation of capability displays unique to the composition of the battle group in use
- Incorporation of mapping libraries to allow display of capabilities with respect to a specific geographic area

II. DECISION SUPPORT SYSTEM SOFTWARE DEVELOPMENT

A. INTRODUCTION

The previous chapter discussed the rationale for the development of this thesis, as well as structure, and some of the key components of the design utilized. This chapter addresses the development of the software which supports the Decision Support System. The discussion will cover the schema utilized for the system, definitions of common system variables, as well as a general overview of the construct of the system modules. It is intended that this chapter be utilized in concert with the system program (not attached to this paper), which is written with algorithmic descriptions incorporated into each program unit.

B. PROBLEM FORMULATION

The fundamental challenge of this thesis was to develop a functional support system for a battle group commander. This system was to provide for the display of specific force databases, as well as be capable of translation of certain capabilities in those databases into discernible computer graphics displays. Parallel to these efforts, development of a functional user - computer dialogue format was considered essential. In short, therefore, this thesis addressed the challenge of developing an interactive computer database management/computer graphics system, which was "user friendly," and incorporated the capabilities of today's battle groups.

C. SOLUTION STRUCTURE

The program was written in FORTRAN-77, American National Standard (ANSI X3.9-1978), with extensions developed by Digital Equipment Corporation (DEC) [Ref. 5] for execution on a VAX 11 or PDP-11 series computer. Additionally, the DI-3000 graphics language is utilized for the graphics unique capabilities of the system. The control medium for this system accomodates commands from the terminal keyboard, as well as commands entered through discrete speech voice recognition equipments. The Threshold Technology's T-600 was the voice input device for this program. However, any compatible equipment could be utilized. The graphics output was generated on RAMTEK high-resolution graphics interfaces and monitors.

D. PROGRAM GENERAL SCHEMA

For the ease of software design and program testing, this system was designed around the construction of eight (8) major modules. With the exception of the "MAIN Module," each module comprises an assemblage of subroutines which focuses on the features incorporated in that module. In cases where a subroutine is required by more than three (3) sections of the program, that subroutine was included in a general section, at the end of the program. As an extension of the program itself, succeeding topics in this section will address the design of each module group. In addition, a glossary, by block common designations, will be provided to facilitate following the flow of the program.

E. SIGNIFICANT ADJUSTMENTS

There were five principle areas which were cumbersome in the development of this program. They are enumerated below with mention of the vehicles by which they were overcome.

a. Management of the Databases

There were four databases developed for this system. The first, the Master Database, contained coded capabilities for 130 Pacific Fleet units, with some additions to provide AEGIS assets. This database was oriented around the name of a particular ship. The database would be utilized by the user, in identifying the name of a battle group unit, and the system locating the record associated with that ship and reading the record. For ease of management, an indexed-keyed access format was utilized for this file. The primary key field was the name of the ship. The secondary key fields were the first two and first three, respectively, characters of the unit's hull designation. The secondary keys were so devised to enable distinction between guided missile equipped units and those which were not. The DEC extensions which address these capabilities are discussed below.

The second database was incorporated into the system to allow the user to use the short form name of a ship, for example, "FOSTER" for "PAUL F FOSTER," or "CONNIE" for "CONSTELLATION." This distinction was important, as the master database utilized the full name of the included ships. This database file was also formatted in a keyed indexed manner.

The third database was actually a group of three files which contained the database elements for the particular battle group, which were developed by the user. These files used a sequential access method.

Finally, the communications circuits in the battle group COMM plan were stored in a seperate database or file. The composition of this file was, again, a keyed indexed organization, based on a primary key of circuit ID numbers. The file contained the ID, circuit name, frequency range, and net control station.

(1) Indexed/Keyed Organization Access. Records in an indexed file are ordered by the fields of those record elements designated as key fields. This organization, then, specifies the order of processing of the records in the file. You must specify the locations within the records of the primary key field (mandatory), and any alternate key fields. Once the record corresponding to the identified key has been located, this organization type allows sequential access to succeeding records in that file if desired. [Ref. 5: pp. 7-3 to 7-5]

b. Correction of a Capability in the Master Database

There were foreseeable situations where a change in a unit's capability was to be incorporated into the Master Database. This eventuality is accomodated, by allowing manual input of the change in capability. In order to adjust the Master Database to reflect this change, a REWRITE feature was utilized.

(1) REWRITE a Record in a Indexed/Keyed File. The REWRITE feature transfers output data from internal storage into the current record in an indexed file. You must first locate the record you desire to change, with a READ statement, then REWRITE will update the record as you have indicated. In this program, only FORMATTED REWRITE statements were utilized, indicating that the record had a specific format associated with the data entries. [Ref. 5: p. 7-37]

c. Conversion of Ship Name into Graphics Integer Form

Unique to the DI-3000 graphics language, the text primitives displayed on the monitor are required to be

in internal/integer form. The difficulty arose when the ship's names, which were CHARACTER*19 variables, were required to be displayed along with the force capabilities. The necessary conversion of these character variables to internal form was accomplished through the use of the DECODE extension.

(1) DECODE Operations. The DECODE statement allows the conversion of character variables into internal (binary) form according to a specified format statement. For display to the graphics monitor, the names of the ships were transformed from their character form, and segmented into a five element integer array which was the useable form for display. [Ref. 5: pp. A-1 to A-2]

d. Segmenting a Multi-Element Command String

In several of the display modules, the number of available options required the system to be able to discriminate the key portions of multi-element commands. An example of this requirement is reflected in the command string "DISPLAY UNIT NIMITZ." Each component of this three element command was selected from several options. These options additionally were of differing lengths. The system, therefore, had to break the command into these components. The command was read into the system as a thirty-four (34) element integer array, and through the use of the ENCODE extension, the program converted each of the appropriate command elements into their proper character formats.

(1) ENCODE Operations. The functioning of the ENCODE extension is identical to that of the DECODE function, only in reverse. The integer command string was first broken into segments, with the position of the spaces indicating a new element. Next, each of these integer

segments was transformed into character form according to the format required for the particular command element. [Ref. 5: pp. A-1 to A-2]

1. Orientation of Ship Names on Graphics Plot

Depending on the scale in use when the graphics capabilities of the system were utilized, a great deal of clutter reduced the effectiveness of the display. This was predominately due to the congestion involving ship names in close proximity. This clutter was reduced by orienting the name of the ship commensurate with its relative position in the display. The subroutine "ORIENT," to be discussed later, made a comparison of the position of the unit to be displayed, with respect to the plot quadrant it was in. Based on the result of this comparison, the DI-3000 "JJUST" call was controlled to reduce the numbers of overlapping names. The function of the "JJUST" subroutine in the DI-3000 language is to orient the display of text at the position specified. The call to this routine will cause the text to be "justified" at its center, left, or right sides, as well as with respect to the top or bottom of the letters in the text.

F. DSS FILE COMPOSITION

This Decision Support System resides in the Wargaming Analysis and Wargaming Laboratory (WARLAB) at the Naval Postgraduate School. The user name under which it is operated is called "DECISION." Should this user account not be available on-line, the complete system is available on tape in the Lab. The main program, object, and execution files all have the "DSS" name associated with them. The following files support the operations of the system and are organic to this account.

- FCR011.DAT --- This file contains the master database for the DSS. The database is a formatted, keyed access file as discussed above. It is from this file that the program will automatically locate the database for the ship identified, and transfer that data into the battle group operating databases.

- FCR012.DAT --- This file is a keyed access formatted file which contains the short form names of some of the ships in the master database. When the system searches the Master Database to extract the capabilities of a unit, should a name match not occur in this search, the system will first check this file for a short form name match and conversion to the full form name, before the unit will be "flagged" for manual database entry.

- FCR007.DAT --- This file is created through the functioning of the system. A "SAVE" capability, allows the user to store the data which he/she has developed, and terminate the session, resuming it at a later time. This file is sequentially organized and contains control variables, number of ships in the battle group and their names. It is used, when the user next initiates a session with the system, to reaffirm that a battle group had been formed previously.

- FCR008.DAT --- This file is also generated when the "SAVE" feature is exercised. In addition to the names of the units, as was available in FOR007.DAT, this file also contains the complete database for the units designed into the particular battle group. This is what is referred to in the system as the "battle group database." It is read into the system, and is organized through the use of linked lists. A representative record in this file is more comprehensive than its

counterpart in the master database. This database will reflect current capabilities, as well as user generated information as to unit position, explanatory remarks, etc. This file is sequentially organized.

- FCR009.DAT --- This is the third file generated by exercising the "SAVE" feature of the system. The Composite Warfare Commander organization is stored here. The contents of this file are the names of the warfare commanders/coordinators, the respective organizations functioning in those capacities, and the unit on which the respective commander/coordinator is embarked. The file is sequentially organized.

- FCR019.DAT --- The communications plan structure is contained in this resident file. As with the master database (FOR011.DAT), this file is referenced from the CCMMS Module, however, the information contained therein is not transferred to DSS for manipulation. This file has a keyed indexed organization based on the primary key of circuit ID number. The remainder of each record contains the name of the net, the net control station, the frequency range, and the applicable mission area for which this net is used.

G. BLOCK COMMON VARIABLE DEFINITIONS

In an effort to minimize the necessity for passing large numbers of variables between using subroutines, extensive use was made of "Block Common" constructions. These blocks grouped those variables whose use was similar, and whose data type was the same. As a reference to be utilized when reading the program, the following sections address each of these blocks and define the variables which are contained therein. It is not the intent, however, that a complete

discussion of the range of possible variable values be included. For a comprehensive review of the values which the variables could assume, reference should be made to the User's Manual, chapter three of this thesis. The array dimension of the particular variable is shown in parentheses.

a. BDAT1 NUMSHP, FIRST, FREE, LINK(25)

This block groups the basic integer data regarding the organization of the battle group database. The definitions of the variables contained in this block are as follows.

- NUMSHP --- Number of ships in the battle group
- FIRST --- Header for the battle group database linked list
- FREE --- The first available record position in the battle group database
- LINK --- Battle group database link values

b. BDAT2 --- HULL(25), UNIT(25), REMARKS(25)

This block contains the complement to the integer base data for the battle group database, the base character variables. The definitions of these variables are as follows.

- HULL -- A *6 variable representing the hull number of the ship
- UNIT -- A *19 variable representing the name of the ship
- REMARKS -- A *25 variable of a general nature, input by the user as descriptive remarks about the respective ship

c. POSIT1 --- COSYS, ZZ QUAD(25)

This block organizes one of the two positioning variable groups, and represents the character variables involved with the ship positions. There is an additional position block which is unique to graphics displays and is addressed seperately. The following is the composition of this block.

- COSYS -- A *5 variable indicating the type of coordinate system in use (polar or cartesian)
- ZZ -- A *19 variable indicating tThe name of the unit at "ZZ"
- QUAD -- A *1 variable indicating the position quadrant of a unit (implies cartesian positions are being used)

d. POSIT2 --- XPOS(25), YPOS(25), BRNG(25), RNG(25), SPEED(25)

This block complements the previous variable grouping with the integer variables associated with the positioning of the ships. The composition of the block is as follows.

- XPOS -- The position of the ship in the "x" direction (implies the use of cartesian coordinate system)
- YPOS -- The position of a ship in the "y" direction (implies the use of cartesian coordinate system)
- BRNG -- The bearing of a ship from "ZZ" (implies the use of the polar coordinate system)
- RNG -- The range of a ship from "ZZ" (implies the use of the polar coordinate system)
- SPEED -- The maximum speed of a ship

e. ADMIN1 --- CRUDES(25), DESRON(25)

This block includes the character variables which represent the elements of the administrative organization of a unit's database. The composition of this block is as follows.

- CRUDES -- The cruiser destroyer or carrier group to which a ship is assigned
- DESRON -- The destroyer squadron to which a ship is assigned (not applicable to aircraft carriers or service force ships)

f. ADMIN2 --- PRMAR(25), SCMAR(25)

This block contains the primary and secondary mission areas of a ship. These are character variables. The composition of the block is as follows.

- PRMAR -- A *3 variable representing the primary mission of a ship
- SCMAR -- A *3 variable representing the secondary mission of a ship

g. SCHRDR --- SRSCH(25), ARSCHA(25), ARSCHE(25)

This block represents the search radars in the database. These are integer variables, and the composition of the block is as follows.

- SRSCH -- The variable representing the surface search radar onboard a ship
- ARSCHA -- The variable representing the primary air search radar onboard a ship
- ARSCHE -- The variable representing the secondary air search radar (as applicable) onboard a ship

h. WEAPN1 --- PHAL(25), GUN(25), MYSLA(25), MYSLB(25)

The parameters of the weapons capabilities of the database are represented in this block. These are integer variables, and the composition of the block is as follows.

- PHAL -- The number of PHALANX systems onboard a ship
- GUN -- The variable representing the type of gun system onboard a ship
- MYSLA -- The variable representing the type of primary missile system (as applicable) onboard a ship
- MYSLB -- The variable representing the type of secondary missile system (as applicable) onboard a ship

i. WEAPN2 --- HARP(25), TOMA(25), SLQ(25)

This block contains the character variable complement of the weapons block above. The composition of this block is as follows.

- HARP -- A *1 variable (Y/N) indicating whether a ship has a HARPOON capability
- TOMA -- A *1 variable (Y/N) indicating whether s ship has a TOMAHAWK capability
- SLQ -- A *1 variable (Y/N) indicating whether a ship has an AN/SLQ-32 capability.

j. WPNRDR --- FCRA(25), FCRB(25)

The fire control radar capability of a ship is represented in this block. These are integer variables, and the composition of the block is as follows.

- FCRA -- The variable representing the primary fire control radar (as applicable) onboard a ship

- FCRE -- The variable representing the secondary fire control radar (as applicable) onboard a ship

k. COMM --- SAT(25), UHF(25), HF(25), UHFAVL(25), HFAVL(25)

This block contains the communications capabilities of the ships in the battle group. These are integer variables, and with the exception of the SAT variable, represent the actual number of equipments. The composition of this block is as follows.

- SAT -- The variable indicating the type of satellite communications capability (as applicable) onboard a ship
- UHF -- The number of UHF radios installed onboard a ship
- HF -- The number of HF radios installed onboard a ship
- UHFAVL -- The number of UHF radios available onboard a ship
- HF -- The number of HF radios available onboard a ship

l. SENASW --- IVDS(25), TASS(25), SONAR(25)

This block contains integer variables representing the types of ASW sensors available in the battle group. The composition of the block is as follows.

- IVDS -- The type of IVDS equipment (as applicable) onboard a ship
- TASS -- The type of TASS equipment (as applicable) onboard a ship
- SONAR -- The type of sonar (as applicable) onboard a ship

m. WPNASW1 --- ASWROC(25)

This block represents the character variable indicating the type of ASW rocket onboard a ship, as applicable. The representation of this variable is "A" for ASROC, "S" for SUBROC, or "N" for NOT CAPABLE.

n. WPNASW2 --- TORP(25)

This block contains the integer variable representation of the type of torpedo onboard a ship. The composition of the variable is "1" for MK-46, "2" for MK-48, or "0" for NOT CAPABLE.

c. AIRCAP --- HELO(25), EMB(25)

This block addresses the aircraft capability of the battle group with respect to type of helicopters available within the force. The composition of this block is as follows.

- HELO -- A *1 variable indicating the type of helicopter capability a ship has onboard
- EMB -- A *1 variable (Y/N) indicating the embarcation status of a ship which is helicopter capable

p. COMAND --- CMD(8), ORG(8), EMBARK(8)

This block contains the composition of the CWC Organization. The representations of these character variables are as follows.

- CMD -- A *5 variable representing the name of a warfare commander/coordinator -- this value is fixed in the BLOCK DATA section of the program
- ORG -- A *25 variable representing the name of the organization functioning as a warfare commander/coordinator

- EMBARK -- A *19 variable indicating the name of the ship on which the warfare commander/coordinator is embarked

q. RAM1 --- ORD(37), ABS(37), SCALE, SIZE, CHAR_SHIP

This block contains real variables which are utilized in the graphics portions of the program. They relate to the graphics plot parameters associated with the display capability of this DSS. With the exception of the ORD and ABS variables, these values are fixed in the BLOCK DATA section of the program. The composition of this common block is as follows.

- ORD -- Plot "x" position of a ship or display feature (1-25 -- ships, 26-35 -- ship temporary positions, 36-37 -- AEW/CAP features)
- ORD -- Plot "y" position of a ship of display feature (1-25 -- ships, 26-35 -- ship temporary positions, 36-37 -- AEW/CAP features)
- SCALE -- The scale (1-5) controlling the dimensions of the display coverage
- SIZE -- A scaling factor applied to displayed graphics text primitives used to maintain balance with the plot dimensions
- CHAR_SHIP -- A control variable used as the basis for the size of the ship name text primitives displayed on the screen

r. BASPOS1 --- BASQUAD

This block contains the character variable representing the quadrant in which the ship functioning as "ZZ is positioned. The variable is utilized in the compu-

tation of the graphics equivalent positions of the remainder of the ships in the battle group.

s. BASPOS2 --- BASORD, BASABS, POSX, POSY

This block contains the integer (BASORD,BASABS) and real (POSX, POSY) variables which are utilized to orient the graphics plot to the position of the "ZZ" ship. It is also used in computing the required offset for the display of the cartesian coordinate grid, an option in the graphics portions of the DSS. The composition of the block is as follows.

- BASORD -- The "x" position of the ship at "ZZ"
- BASABS -- The "y" position of the ship at "ZZ"
- PCSX -- The graphics plot "x" coordinate for the origin of the cartesian grid display
- PCSY -- The graphics plot "y" coordinate of the origin of the cartesian grid display

t. VIRTUAL --- LEFT, RIGHT, UP, DOWN, LPORT, RPORT, UPORT, DPORT

This block contains the parameters associated with the definition of the graphics display plot. They are tied to the DI-3000 inputs addressing the WINDO size and the VIEWPORT size. These are real variables and their values are fixed in the BLOCK DATA section of the program. The composition of the block is as follows.

- LEFT --- The left dimensional limit for the WINDO of the graphics display
- RIGHT -- The right dimensional limit for the WINDO of the graphics display

- UP -- The upper dimensional limit for the WINDO of the graphics display
- DOWN -- The lower dimensional limit for the WINDO of the graphics display
- LPORT -- The left dimensional limit for the VIEWPORT of the graphics display
- RPORT -- The right dimensional limit for the VIEWPORT of the graphics display
- UPORT -- The upper dimensional limit of the VIEWPORT of the graphics display
- DPORT -- The lower dimensional limit for the VIEWPORT of the graphics display

B. MODULE COMPOSITION AND CAPABILITIES

The following sections of the chapter will address the general composition and capability of each of the modules in this program. Within the discussion of each module, a brief description of the purpose of each subroutine within that module will be presented. This section is intended to be utilized in conjunction with the DSS computer program.

1. MAIN Module

The MAIN module is the program unit which serves as the substructure upon which the remainder of the system is formed. The module is oriented around a BLOCK IF construction which discriminates among the options (system modules) presented.

2. BUILD Module

The BUILD module of this program allows the user to build a local battle group database composed of ships which

the user designates. Additionally, this module functions as the point from which the user can INSERT or DELETE a ship from the battle group. The BUILD subroutine will differentiate between the user's desires to develop the database for an entire force, or make individual changes to an existing structure, through the use LOGICAL IF and BLOCK IF constructions. There are two parameters which are required by the BUILD subroutine. The first (SEXIST), is a logical variable which flags the existance of a current battle group database. The second (FIRSTC), is again, a logical variable which is changed in the subroutine to indicate that this module has been called. The system requires that this module be called prior to operations in any other module with the exception of the DATABASE module, discussed later. Within the BUILD Module, the numbers and names of the battle group ships, as well as their positions are determined. The search for the ship record in a master database is accomplished through the SEARCH subroutine, organic to this module. BUILD will also call the MANUAL subroutine, utilized for manual input of a ship' s database if the ship cannot be located in the master database. Finally, from this module, the CWC organization can be developed through the use of the CWC subroutine, organic to the BUILD module.

a. Position Subroutine

This subroutine is utilized by several of the system modules to input, change, and display the positions of the ships in the force. There are four entry points into this subroutine, controlled by a COMPUTED GOTO construction. These entry points, specified by the parameter "TARGET" are BUILD module battle group Initialization (1), BUILD module INSERT function (2), STATUS module (3), and SENSOR module (4). This subroutine allows for the specification of coordinate system, polar or cartesian, and

the position identification of each ship. Additionally, this subroutine develops the basic parameters upon which the graphics coordinate system is computed. This is done through the use of the PLOTP (polar) or PLOTC (cartesian) subroutines in the SENSOR module.

b. CWC Subroutine

This subroutine allows for the initial establishment of the CWC organization as well as future display or component changes. The design of this subroutine is oriented around two COMPUTED GOTO constructions. The first differentiates between which module called the subroutine, Build module CWC organization initialization (1), STATUS module Display option (2), or the STATUS module Change option (3). The second COMPUTED GOTO construction is utilized to orchestrate movement through the components of the eight (8) warfare commanders/coordinators in the organization. A key feature in the operations of this subroutine is the elimination of redundancy in the identification of organizations and embarked units. The program will attempt to match an input the user makes to any of those already input. When a match occurs, say in the naming of an embarked unit, the program assumes the value will remain as previously specified and will not query the user to repeat the input.

c. SEARCH Subroutine

This subroutine will search the master database (FOR011.DAT) for the records associated with the named ships, and extract the appropriate record. This subroutine will also use the MATCH subroutine to allow the user to input a short form name for ship, convert it to long form, and reinitiate the search.

d. MATCH Subroutine

This subroutine will attempt to match a short form name of a ship through the use of file FOR012.DAT.

3. STATUS Module

The STATUS module in the Decision Support System allows the user to change an element in a particular ship's database record, change force positions, or change an element of the CWC organization. Additionally, this module provides the vehicle whereby the user can display to the terminal screen, the positions of the force, as well as the names of the units with specific weapons capabilities. This module is designed to operate without the use of computer graphics. The functioning of this module is oriented around the interpretation of a thirty four (34) character command string, which is segmented through the use of the ENCODE fortran extension, discussed earlier. Each command string is broken into three character variables which respectively address, the major module options, database component to which this option is to be applied, and finally, the display or category specifier. Once the command string has been broken into the appropriate segments, the module utilizes BLOCK IF constructions to discriminate between the various segments. The STATUS subroutine comprises the largest portion of this module.

a. DISDAT Subroutine

Organic to the STATUS module, the DISDAT subroutine provides the framework upon which the specific equipment names and associated ranges are translated from the codes utilized in the program databases. The operations of this subroutine are oriented around two general groupings of COMPUTED GOTO constructions. The first differentiates

between the calling subroutines and directs program functions in either an equipment display or nomenclature/range display direction. While this subroutine is principally used by the STATUS module, it does provide the terminal screen displays of specific equipments utilized by the SENSOR and WEAPONS modules.

4. COMMS Module

The communications module is designed to accomplish two objectives. The first function is to manage the numbers of available radios onboard a ship for comparison with the installed capability. Second, this module will display the participants of a specified communications circuit on the graphics monitor. The query/response sequencing is accomplished through the use of menus from which a number entry is required to specify a desired option. Unlike the SENSOR and WEAPONS modules, which cannot be operated if a graphics capability does not exist, the radio numbers management capabilities of this subroutine can be exercised without any graphics capability.

5. SENSOR Module

This module is totally reliant upon computer graphics for its operations. The call from the MAIN module to this module is made through a graphics control subroutine discussed later. This is the reason that the SENSOR module cannot be operated without a computer graphics capability. Within this module, the user can generate displays of the coverage areas of specified force sensors. The identification of the specific sensor is made in a manner similar to that used in the STATUS module. The command string for this module is allocated 34 characters in length, and is comprised of two components which are seperated, and converted to character representation. This is

accomplished through the use of the ENCODE Fortran extension. Once the segments of the command string are identified, a BLOCK IF construction is utilized to direct the program flow through the various options. There are numerous calls to DI-3000 unique subroutines within this module; however, they will not be discussed.

a. PLOTP and PLOTC Subroutines

While organic to the SENSOR module, these subroutines are principally utilized by the POSITION capability of the BUILD module. The PLOTP/PLOTC subroutines will translate the user's polar or cartesian positions for a unit into useable coordinates for the graphics displays. The PLOTP subroutine uses a trigonometric calculation to make this conversion, whereas the PLOTC subroutine utilizes a BLOCK IF construction which makes a comparison to the "ZZ" unit's "base" position.

b. AREA Subroutine

The AREA subroutine is the principle program driver from which the coverage areas of the various force sensors and weapons are generated. This subroutine will cause the VIEWPORT to be defined for the coverage display. Additionally, it will convert the name of a ship into an internal form useable by the graphics system, through the use of the NAME_CONVERT subroutine. AREA will call the DISDAT subroutine in the STATUS module to obtain the range for the specific sensor or weapon system it is plotting. While organic to the SENSOR module, this subroutine is also utilized by the WEAPONS module.

c. ASW_AREA Subroutine

This subroutine is a derivative of the AREA subroutine discussed above. The reason for the

differentiation between these two capabilities is that the force ASW display features are more complex than those used in displaying the radar coverages. This is because with the ASW display, optional convergence zone capabilities must be identified, matched to the sonars capable, which are further matched to those ships which have those sonars. Similar to the AREA subroutine, ASW_AREA will establish the graphics VIEWPORT, convert the name of the ship into useable graphics form, and access the range of the specific equipments through the DISDAT subroutine.

d. Sensor Display -- Title Generation

The generation of the titles for the various display options in the SENSOR module is discussed collectively for all the module options. The following subroutines are used to place the display title on the graphics monitor: AIR_SEARCH, SURFACE_SEARCH, FIRE_CONTROL, and SUB_SURFACE. The displays to which these subroutines correspond should be evident. The operations of each of these subroutines is identical. Each will establish a secondary VIEWPORT and WINDO at the bottom of the monitor, and will display the text primitives reflective of the information shown on the graphics plot.

e. CZ_ZONE Subroutine

The function of this subroutine is to ascertain first, whether convergence zone sonar propagations exist, and second, if they do, does the unit being displayed have a sonar capable of operating in this mode. The determination of the existence of the propagation mode is done through a YES/NO query which establishes the value of a logical variable which is passed to the subroutine. Once determined, a COMPUTED GOTO construction, through the comparison with the coded sonar type onboard the unit concerned, generates a

logical variable "CONVERG," which keys the display of the second coverage zone on the ASW sonar display.

6. WEAPONS Module

As its name implies, this module is utilized to display the coverage areas of the force weapons systems. Like the SENSOR module, WEAPONS is totally reliant on a graphics capability and is invoked from the MAIN module through a graphics control sequence. The module operates from a master menu where the user selects a specific weapon capability to be displayed. The lengthy command strings utilized in earlier modules do not apply to WEAPONS. The module functions through the use of a BLOCK IF construction discriminating between the various weapons capabilities. WEAPONS uses self-contained program code for the generation of all available displays. This code is identical to that used in the SENSOR module, but additionally, allows for the display of multiple capabilities simultaneously, for example TOMAHAWK and HARPOON, or MISSILE and GUN.

a. WEAPONS_LABEL Subroutine

As the name implies, this subroutine is designed to generate the labels for the coverage displays selected in the WEAPONS module. A BLOCK IF construction is used to create the appropriate label based on the capability being displayed.

b. ASW_WEAPS Subroutine

This subroutine displays the coverages for the force ASW weapons systems. The subroutine will assemble and display a coverage view reflective of each unit's helicopter, ASW-Rocket, and torpedo capabilities. Each of these capabilities are color coded in the view.

7. DATABASE Module

This module will display to the terminal screen, the names and hull numbers of the ships in the master database, grouped according to ship type. This module is operated through the use of a menu from which an identification number corresponding to the desired ship type is selected. The module then uses a COMPUTED GOTO construction to effect the computation of the key value and key field length necessary for accessing the appropriate records in the master database.

8. SAVE Module

The purpose of this module is to store the developed battle group database prior to a session termination, should the user so desire. This module will extract the database values, and create the three files discussed earlier, FOR007.DAT, FOR008.DAT, and FOR009.DAT. Once these files are created, the module will issue the FORTRAN STOP command, thereby terminating the session. Designed into the schema of the DSS is a program initiated automatic save of the battle group database after initialization in the BUILD module. This is done only to provide a back-up should power be interrupted but will not guarantee permanent retention of the database should the user terminate his/her session with a STOP command from the MAIN module.

9. Major Subroutines

a. WAIT Subroutine

This subroutine is incorporated into every module to allow the user to pause and take some time reviewing the displayed information. Its construction is simply providing instructions to "Press return," and a READ statement which looks for an A1 formatted variable.

b. MANUAL Subroutine

This subroutine is lengthy. It has been designed to accomplish two major functions. First, should a ship in the battle group not reside in the master database, this subroutine allows that unit's capability record to be written to both the battle group database and the master database (through the use of the DATA_CHANGE subroutine). The construction of this subroutine is oriented around multiple queries and capability menus. The user need only select the appropriate capability from the menu to include that capability on the ship in question. The MANUAL subroutine is also used by the STATUS module in changing an element of a unit's database record. By designation of the desired capability to be changed, the appropriate menu from this module is displayed for capability selection.

c. CONTROL Subroutine

The CONTROL subroutine exists as the front and back end program unit for all graphics displays. This subroutine makes the foundational calls to the required DI-3000 graphics routines. Additionally, this subroutine will determine the number of the desired graphics monitor to be used. This number is unique to the WARLAB at NPS.

d. GRID Subroutine

This subroutine overlays a cartesian coordinate grid on the displayed capability coverage display. The grid is scaled to the size of the plot in use, and its origin is offset commensurate with the cartesian position of the unit at "ZZ."

e. THREAT Subroutine

This subroutine creates a threat sector on top of a displayed capability coverage. The parameters for the generation of this sector, are the threat bearing and sector width, both provided by the user through a query dialogue with the system.

f. MOVE Subroutine

A major capability of this DSS is to allow the user to experiment with the coverage display created by moving a unit and observing the resultant effect on coverage that moving the ship's sensor/weapon would have. This subroutine parallels the main graphics modules by repeating their displays with a designated new position for a unit identified by the user. MOVE will create color-coded companion references to the old position as well as generate legends for evaluation of the new information being displayed. MOVE is only called from the SENSOR or WEAPONS modules.

g. COMBAT Subroutine

This subroutine is used to discriminate between surface combatant ship types and those non-combatant ship types. It is called from the MANUAL subroutine to eliminate the query for a database item not available to the ship type whose database record is being created.

h. LIST Subroutine

The LIST subroutine simply utilizes the link list structure of the battle group database to display the names of the units in the battle group. This subroutine is called whenever identification of a battle group unit is required, to assist the user in making the correct response.

i. LOCATE Subroutine

This subroutine is utilized whenever a ship name from the battle group is the desired input to a query. LOCATE will, as its name implies, locate the ship within the link list structure, flag it "found," and pass the sequence number of the ship back to the calling module. This subroutine is used throughout the program.

j. NAME_CONVERT Subroutine

NAME_CONVERT will truncate the name of a ship for use in the graphics displays. This subroutine was devised to eliminate some of the clutter generated by the overlapping of the ship's names on the plots. However, its principle function is to convert the name of the ship, a character variable, into an internal form useable by the DI-3000 text primitives.

k. ORIENT Subroutine

This subroutine compares the coordinates of the ships graphics position with the quadrant in which it is in, and establishes the appropriate justification values for the JJUST call in the DI-3000 text output primitive. It basically justifies the name to ensure it is pointing outward, away from the center of the plot.

l. DATA_CHANGE Subroutine

DATA_CHANGE will accomplish one of two things. First, it will write a manually developed ship database record to the master database. If the record already exists,this subroutine can be used to REWRITE (discussed earlier) the record should the user desire to make a capability change permanent.

Now that the design of the program has been discussed, the next chapter of this thesis will address utilizing the DSS. The User's Manual, as has already been mentioned, can be used as a reference, or as an instruction on the operations of the DSS. The DSSdoes explain enough information that the reading of the User's Manual prior to conducting a session is not necessary.

III. DECISION SUPPORT SYSTEM USER'S MANUAL

A. INTRODUCTION

Welcome to the Battle Group Asset Management Decision Support System. Now that you are ready to operate the system, the topics that follow will elaborate on the capabilities of the computer program. It is important to recognize at the outset that the complexity of your interaction with the system is NOT dependent on your having a Computer Science degree. You cannot "bomb" the program or accidentally damage any of the databases. Every request for information has been protected. Should you inadvertantly enter an incorrect character, the system will recognize that fact and ask you to reenter an acceptable value. This "error checking" also applies to the spelling of the names of the ships you will be using. Your bywords should be "relax, I can't hurt anything."

With an eye towards flexibility, the program can be operated either from the keyboard of a computer terminal (in this case a VT-100/102), through voice recognition equipment, or through both simultaneously. Throughout this User's Manual, both the keyboard and the voice entry response options will be shown for each query.

The database for this DSS in oriented to the Pacific Fleet. The 130 ships in the database comprise those PACFLT units whichcould be expected to be assigned to a battle group. While the service force units are included in the database, there are no amphibious ships included.

If you were to group the program capabilities into two general categories, you would differentiate between those portions which rely on graphics software (DI-3000) unique

operations and those that don't. In general, the WEAPONS, SENSOR, and COMMS(for the display Comm Net capability only) modules utilize computer graphics. If you do not have a graphics capability at the position where you are operating, then you cannot attempt to utilize these sections without causing an ERROR to occur in the computer operating system. If this applies to you, simply do not attempt to use those sections.

This User's Manual has been designed to give you an exposure to all the interactions you could expect to have with the system. In each example, you will be shown sample entries from both the keyboard (KB) and the voice recognition (VR) equipment. The samples will be prefaced by KB or VR, as appropriate. Throughout the manual, when entering a command from the keyboard, you will be required to depress the CARRIAGE RETURN key (designated as <cr>). Also, all commands from the keyboard MUST be in upper case. This differs somewhat from the operations using the voice recognition equipment. There will be some voice commands which already have incorporated into their output strings a CARRIAGE RETURN. There will be others, however, which require that the CARRIAGE RETURN command be input. Examples for the commands from the VR equipment will be very explicit, and will show the command "Carriage Return", if required. You can refer to Appendix A for a detailed explanation of the voice commands and applicable output strings.

There will be occasions when the sample command is shown within the text of a corresponding explanation. In these cases, the commands will be shown within quotes. If they are keyboard commands, DO NOT enter the quotes with the command, simply enter the portion of the example within the quotes.

While we are on the topic of the CARRIAGE RETURN function, the program will occasionally pause to allow you to examine the information on the screen. In these cases, there will appear at the bottom of the screen the following statement.

*** PRESS CARRIAGE CONTROL TO CONTINUE ***

To carry out this command, you would enter the following:

KB -- <cr>
VR -- "Carriage Return"

Finally, in most cases, the screen display for the queries we will be discussing will be shown in figures adjoining the explanation. There will be some occasions where the information displayed in a figure will not be in the exact format which you would see on the screen. This is due to the fact that on the screen, 80 columns of information can be displayed, whereas in the figures, only 54 columns of information can be shown. The contents of the information in the figures will be complete, however its format will be different. In these cases, the reference to the applicable figure will have "(adjusted)" written after the figure number. An example of this would be when there are two large groups of information displayed side by side on the screen. In most cases, the figure representing the information would show the same information in a single columnar fashion. This will become more clear to you as you proceed through this manual, and operate the system. The next step is to get going with the system.

B. INITIATING THE PROGRAM AT THE TERMINAL STATION

Logging on to a computer system and running a program are unique to the particular system. This Decision Support

System was developed on a VAX 11/780 computer system which had a RAMTEK color graphics capability associated with the computer operating system. The following procedures are unique to this system. You may have to adapt them to your own system as appropriate. If you are also utilizing the DT-600 voice recognition equipment, you should load the voice tape into the program tape reader at this time. Additionally, connect the T-600/VT-100/102 and the VAX 11/780 together using the interface designed for this purpose in the WARLAE. Now you are ready to go.

If USERNAME is not currently being displayed on the terminal screen, you should enter the following:

KB -- <cr>
VR -- "Carriage Return"

1. Login/Program Initiation from the Keyboard

Now that USERNAME is being displayed, and you are operating from the keyboard, enter "DECISION <cr>". You will now see PASSWORD being displayed. (Obtain the password from the WARLAB staff, and make the appropriate entry.) This display will end with the symbol $, and you are now ready to run the program. Enter "RUN DSS <cr>", and you will begin to see the displays from the Decision Support System.

2. Login/Program Initiation through Voice Equipment

If you are operating with the voice equipment, enter "LOG DECISION ON." You will then see administrative information from the operating system on the screen, followed by the symbol $. Now enter "RUN DSS PROGRAM," and you will begin to see the displays from the Decision Support System.

C. PROGRAM DATABASE INITIALIZATION

As was discussed in Chapter I of this Decision Support System, you have the capability to work within the system and then terminate a session without loosing the information you have developed about your battle group. This is done through the use of the SAVE module. When you commence a run/session of the system, you will be presented with one of two series of queries for information. The one which is presented will depend on whether you have stored a battle group database from a previous session. We will look at both versions. We will first examine the situation where there is a saved database and then look at one in which there is none.

1. Battle Group Formed During Previous Session

If this is not your first session with the battle group database, then you will be initially shown the existing composition of the battle group in the database. Figure 3.1 shows an example of the view you would see and reflects a five (5) ship battle group consisting of USS NIMITZ, USS PAUL F FOSTER, USS YORKTOWN, USS MERRILL, and USS GUITARRO already created. You will be queried as to whether or not you desire to continue with this battle group.

a. Desire to Retain the Battle Group

If you desire to retain the existing battle group database, then you would respond to this query as follows:

KE -- YES <cr>
VR -- "Affirmative"

```
A BATTLE GROUP DATABASE HAS BEEN SAVED FROM A PREVICUS
SESSICN.  BATTLE GROUP COMPOSITION IS AS FOLLOWS:

          NIMITZ
          PAUL F FCSTER
          YORKTOWN
          MERRILL
          GUITARRO

???  WOULD YOU LIKE TO CONTINUE WITH THIS DATABASE ???

(YES CR NO)
```

Figure 3.1 Battle Group Already Formed.

b. Does Not Desire to Retain the Battle Group

If you dc not desire to retain the existing battle group database, then you would respond to the query as fcllcws:

KB -- NO <cr>

VR -- "Negative"

The battle group database has now been erased and ycu will receive the follcwing confirmation on the screen.

THE DATABASE HAS BEEN DELETED AND A NEW BATTLE GROUP MUST NOW BE BUILT.

c. Error in Making Response

Figure 3.2 shows the display you will receive if you inadvertantly make a mistake in entering the YES/NO respcnse. Should this occur, simply reenter the response.

```
YOUR RESPONSE IS NOT RECOGNIZEABLE AS AN ACCEPTABLE
ANSWER.  PLEASE ENTER YES OR NO.
```

Figure 3.2 Error in Making YES/NO Response.

2. Program Operation Based on Response

Now that you have made the decision as to whether or not you desire to retain a previously formed battle group, the system will do one of two things based on your decision. If your response was "Yes," the battle group database will be loaded into the operating section of the system, This will be transparent to you with the exception of a possible one second delay in refreshing the screen. If your response was "No," then as was confirmed to you, the battle group database has been deleted. In either case, the next view that you would see is the same as if you were starting the system without any previous information being saved. That will be the topic of our next section.

3. Review of Main Menu Options

If you are initially forming a battle group, or you have already decided on the disposition of the saved battle group database, then the next query you will receive will be to determine if you desire to review the Main Menu options, as shown in Figure 3.3.

If you desire to review the options, enter the following:

KE -- YES <cr>
VR -- "Affirmative"

```
??? WCULD YOU LIKE TO REVIEW THE MAIN MENU OPTIONS ???
(YES/NO)
```

Figure 3.3 Review of Main Menu Options Query.

If you DO NOT desire to review the options enter the follcwing:

KB -- NO <cr>
VR -- "Negative"

a. Error in Making YES/NO Response

If ycu inadvertantly make a mistake in entering the YES/NO response, you will see the view as shown in Figure 3.2, on the screen. If this occurs, simply reenter your response.

4. Display of Main Menu Options

If your response was to display the Main Menu Cptions, then ycu wculd have the display as shown in Figure 3.4 (adjusted) and Figure 3.5 (adjusted) displayed on the screen. They are presented in two segments as the amount of informaticn shown exceeds the capability imposed by the size cf the terminal screen.

When you are ready to continue, enter the follcwing to see the remainder cf ther menu.

KB -- <cr>
VR -- "Carriage Return"

```
**************************************************
*                                                *
*          BATTLE GROUP ASSET MANAGEMENT         *
*             DECISION SUPPORT SYSTEM            *
*                                                *
*                   MAIN MENU                    *
*                                                *
*                                                *
* BUILD   --- ESTABLISH A LOCAL DATABASE BY IDENTIFY-*
*             ING SPECIFIC BATTLE GROUP UNITS OR  *
*             MAKE CHANGES TO EXISTING DATABASE BY *
*             ADDING OR DELETING A UNIT          *
*                                                *
* STATUS  --- CALL OUT, DISPLAY, OR CHANGE BATTLE  *
*             GROUP UNIT POSITION, MISSION, EMBARKED *
*             COMMANDER, NUMBERS OF UHF/HF RADIOS, *
*             AND CHANGE IN ONBOARD SENSORS OF WEA- *
*             PONS SYSTEMS                       *
*                                                *
* CCMMS   --- ESTABLISH PRIORITIZED NETS AND UNIT/  *
*             WARFARE CDR NET PARTICIPATION, GRAPHIC-*
*             ALLY DISPLAY NET OR MSG PATH       *
*                                                *
*                          (MENU CONTINUED)      *

      *** PRESS CARRIAGE RETURN TO CONTINUE ***
```

Figure 3.4 Main Menu Options.

When you are ready to continue, enter the CARRIAGE RETURN command as described above.

5. Selection of Main Menu Options

At this point, you will be queried as to which option you desire to utilize. This query is shown in Figure 3.6.

There is one caution which you should be aware of before you make your selection. If the battle group database exists and you have retained it, then you are free to select any of the Main Menu options shown in Figure 3.6. However, if this is the first session you are having with the system, and/or the battle group has not, as yet, been

```
*     (MAIN MENU CONTI.)                                          *
*                                                                 *
*   SENSCR --- GRAPHICALLY DISPLAY UNIT/FORCE SENSOR              *
*              COVERAGE AREAS AND EXPERIMENT WITH UNIT            *
*              POSITION/SENSOR COVERAGE AREA INTERPLAY            *
*                                                                 *
*   WEAPONS--- GRAPHICALLY DISPLAY UNIT/FORCE WEAPONS             *
*              COVERAGE AREAS AND EXPERIMENT WITH UNIT            *
*              POSITION/WEAPONS SYSTEM COVERAGE AREA              *
*              INTERPLAY.                                         *
*                                                                 *
*   DATABASE---DISPLAY THE SHIPS IN THE DATABASE BY               *
*              TYPE                                               *
*                                                                 *
*   SAVE   --- STORE CURRENT BATTLE GROUP DATABASE IN             *
*              A FILE AND THEN STOP THE PROGRAM                   *
*                                                                 *
*   STOP   --- STOPS THE PROGRAM WITHOUT SAVING THE               *
*              DATA INTO A FILE                                   *
*                                                                 *
*******************************************************************

       *** PRESS CARRIAGE RETURN TO CONTINUE ***
```

Figure 3.5 Main Menu Options (conti).

```
? SELECT ONE OF THE FOLLOWING:
        BUILD    STATUS    COMMS    WEAPONS
        SAVE     SENSOR    STOP     DATABASE


IF YOU DESIRE TO REVIEW THE MAIN MENU OPTIONS ENTER
"MENU"
```

Figure 3.6 Selection of Main Menu Option.

formed, your selections are restricted to either the DATABASE or BUILD options. The reason for this is that all other system modules require some or all of the information contained in the database, which either must exist or initially be established in the BUILD module. Should you

accidentally attempt to enter other than the DATABASE or BUILD modules in this case, you will receive the following warning and will be placed in the BUILD module.

THERE ARE NO UNITS IN THE BATTLE GROUP DATABASE AND YOU MUST FIRST BUILD THE BATTLE GROUP. PLEASE ANSWER THE FOLLOWING QUESTIONS.

For a more detailed explanation of the operations of the various modules in the system, refer to the appropriate section on the operations of that module. For example, information on the DATABASE module would be found in the section entitled DATABASE module Operations. If you are initially forming the battle group, the the following short description of the functions of the BUILD module will be of some value.

a. BUILD Module Functions During Battle Group Initialization

When you are forming the battle group, the BUILD module will orchastrate the collection of data as follows:

- Number of units in your battle group
- Names of the units in your battle group
- Name of the battle group unit to be designated as "ZZ" (for the purposes of this Decision Support System, a battle group unit MUST be at "ZZ")
- Type of coordinate system used for stationing assignments (POLAR or CARTESIAN)
- Positions of all units in the battle group
- Composite Warfare Commander (CWC) Organization
- Helicopter embarcation status for HELO capable units

Once you have identified the names of the units in your battle group, information concerning the onboard sensors, weapons systems, and administrative information (e.g. Group Commander), unique to each unit, is automatically obtained from a master database. This database contains in excess of 130 ships from which to choose. Should a unit in your battle group not be in this master database, you will be asked to provide the necessary information manually through the use of capability menus (discussed in BUILD Module Operations) provided on the terminal screen. Once this manual operation is complete, the unit will be permanently placed in the master database so that in the future, manual information insertion will not be necessary for that unit.

6. Mistake in Requesting a Main Menu Option

To protect you should a mistake be made, there are parts of this system which will check your entries and if they are incorrect, advise you of such and allow you to make a correct entry. An example is contained in the following section.

a. Mispelling of a Main Menu Option

Should you accidentally mispell a request for a Main Menu Option, you will receive a warning as shown in Figure 3.7.

To correct this mistake, simply reenter the desired option. Some examples are shown below.

KB -- BUILD <cr> or WEAPONS <cr> or SENSOR <cr>
VR -- "Build Module" or "Weapons Module"
or "Sensor Module"

```
YOUR SELECTION, AS ENTERED, DOES NOT CORRESPOND TC THE
CHCICES AVAILABLE IN THE MAIN MENU.  PLEASE ENTER ONE
OF THE FCLLOWING:

      BUILD     STAIUS     COMMS     WEAPONS
      SAVE      SENSOR     STCP      DATABASE
      MENU
```

Figure 3.7 Misspelling of a Main Menu Option.

D. MAIN MODULE OPERATIONS

The Main module, as an entity, may be transparent to you. It has been designed as a controller that organizes the flow of your commands/desires between the other modules. Its principle function is to provide you a focal point from which you can easily move to the other modules. You have already seen an example of this as you initialized your battle group database using the DATABASE and/or BUILD modules.

As you move through the modules, when you elect to finish with that particular module, you will always be returned to the Main module. This is signified by the query shown in Figure 3.3. The descriptions of each module, as shown in Figure 3.4 and Figure 3.5, are self explanatory. The remainder of this User's Manual is organized into sections which address the operations of each module. In every case, you will be walked through a session which exercises the capabilities of that module, as well as be shown some of the possible pitfalls or problems you may encounter. There are two modules that require some emphasis at this point, as they will terminate a session in distinctly different fashions. These are the STOP and the SAVE modules. They will be discussed next.

E. "STOP" MODULE AND "SAVE" MODULE OPERATIONS

These two modules are discussed together, as they both result in the termination of a session in the Decision Support System. The SAVE module, however, will first file all the battle group information that you have developed before termination occurs. This contrasts to the functioning of the STOP module which terminates a session without filing any of the developed information. Terminating a session with the STOP module will require you to form a new battle group at the beginning of your next system session. Let's briefly expand on the operations of these two modules.

1. SAVE Module Operations

The SAVE module has been designed to store the database for your battle group when you desire to terminate your session. It is invoked from the query shown in Figure 3.6, as follows:

KE -- SAVE <cr>
VR -- "Save Module"

When you invoke this capability of the DSS, the ship names, capabilities, positions, administrative data, etc., which you have developed for your battle group, as well as the CWC Organization, will all be stored for future use. Having terminated a session with this module, when you reinitiate a DSS session, you will be initially be presented with the information shown in Figure 3.1.

Session termination on the VAX 11/780 will be marked by the statement FORTRAN STOP followed by the symbol $ appearing on the screen. When this occurs, you can terminate your DSS session with the following command.

KE -- LCGO <cr>

VR -- "Terminate"

You are now finished, and can turn the terminal and graphics (if applicable) off.

2. STOP Module Operations

The functioning of the STOP module is straightforward. It will terminate your session without saving/storing any of the information which you have developed. It is invoked from the query shown in Figure 3.6, as follows:

KE -- STOP <cr>

VR -- "Stop Module"

If you have no future requirement for the data with which you have been working, then this is the capability that you should use to terminate your DSS session. Any information previously stored will be deleted when the STOP module is invoked.

The pragmatics of a session termination when using the STOP module on the VAX 11/780 are identical to those described in the section on the SAVE module Operations.

3. Program Initiated SAVE Function

There is nothing more frustrating to the experienced computer user, or intimidating to the inexperienced user than to have the program "bomb," for no explainable reason. The reasons for this are, of course, more often than not, explainable. However, that doesn't restore the sometimes hours of work which may have lead up to the incident. That may be hours of work which were lost.

In an effort to alleviate such anxiety, and protect against a loss of information, the Decision Support System has been designed to perform a one-time automatic SAVE of

the information which you have entered. This will occur at the completion of your first establishment of the battle group database in the BUILD module. You are not required to perform any keystroke or voice command to effect this SAVE. In fact, with the exception of a possible 1-2 second delay in refreshing the screen, it will be transparent to you. This capability is identical to that which you would use by invoking the SAVE module, with the exception that the session will NOT be terminated. In this manner, should a power failure or fluctuation cause the program to "bomb," you will not loose the work you have done. When you reinitiate the program, the information will appear as shown in Figure 3.1, just as if YOU had saved it. Invoking the STOP Module will erase this information before terminating your ISS session.

F. DATABASE MODULE OPERATIONS

There could be two situations in which you may find yourself when using this decision support system. The first, and most predominant, instance will be that you have a battle group formed and you enter the names of the units in that battle group into the system. Transparent to you, the program will take those names and extract from a master database, the capabilities, administrative data, etc., attributable to those particular units. As was mentioned earlier, there are some 130 ships in the master database. So, you can see that all ships in the Navy are not there. Insertion of the name of a unit which is not in the database would require you to enter its database of information manually. If you would like to confirm that one of your battle group's units is in the master database prior to inserting its name in the BUILD module, you could invoke the DATABASE module and access the particular ship type of the unit for which you are looking.

The second situation you may find yourself in is that you are experimenting with theoretical battle group compositions, and would like to select from the list of available units the ships for your battle group. Again, invoking the DATABASE module will allow you to view all of the units in the master database, in groupings of ship type, as you desire.

1. Invoking the DATABASE Module

When presented with the query shown in Figure 3.6, the DATABASE module can be invoked as follows:

KB -- DATABASE <cr>
VR -- "Database Module"

This entry will move you from the Main module into the DATABASE module and you will be presented with the query shown in Figure 3.8 (adjusted).

2. Selecting a Ship Type Option

Figure 3.8 provides the menu for selection of the available ship types in the master database. To display the names and hull numbers of the units in a particular ship type grouping, simply enter the number corresponding to the ship type you desire. An example of this response is shown below.

KB -- 1 <cr> or
13 <cr>
VR -- "One" "Carriage Return" or "One" "Three"
"Carriage Return"

```
**************************************************
*          BATTLE GROUP ASSET MANAGEMENT         *
*              DECISION SUPPORT SYSTEM           *
*                                                *
*                 * DATABASE MODULE *            *
*                                                *
**************************************************

THIS MODULE ALLOWS YOU TO DISPLAY THE UNITS IN THE
MASTER DATABASE AS CATEGORIZED BELOW.  SELECT THE NUM-
BER CORRESPONDING TO THE SHIP TYPE YOU DESIRE.

        1 - SUBMARINES (SSN)
        2 - AIRCRAFT CARRIERS (CV/CVN)
        3 - GUIDED MISSILE CRUISERS (CG/CGN)
        4 - DESTROYERS (DD)
        5 - GUIDED MISSILE DESTROYERS (DDG)
        6 - FRIGATES (FF)
        7 - GUIDED MISSILE FRIGATES (FFG)
        8 - BATTLESHIPS (BB)
        9 - REPLENISHMENT OILERS (AOR)
       10 - FAST COMBAT SUPPORT SHIPS (AOE)
       11 - COMBAT STORES SHIPS (AFS)
       12 - AMMUNITION SHIPS (AE)
       13 - OILERS (AO)
```

Figure 3.8 DATABASE Module Selections.

In this example, the ship type SUBMARINES or OILERS would be selected. Figure 3.9 is an example of what you would see having selected the ship type SUBMARINES (SSN).

```
                * SUBMARINES *

PERMIT          SSN594          GUITARRO        SSN665
LOS ANGELES     SSN688          INDIANAPOLIS    SSN697
LA JOLLA        SSN701

        *** PRESS RETURN TO CONTINUE ***
```

Figure 3.9 SUBMARINES in the Master Database.

If your selection had been in the latter example above, you would be selecting the OILER (AO) ship type, and Figure 3.10 shows the view you would get on the screen.

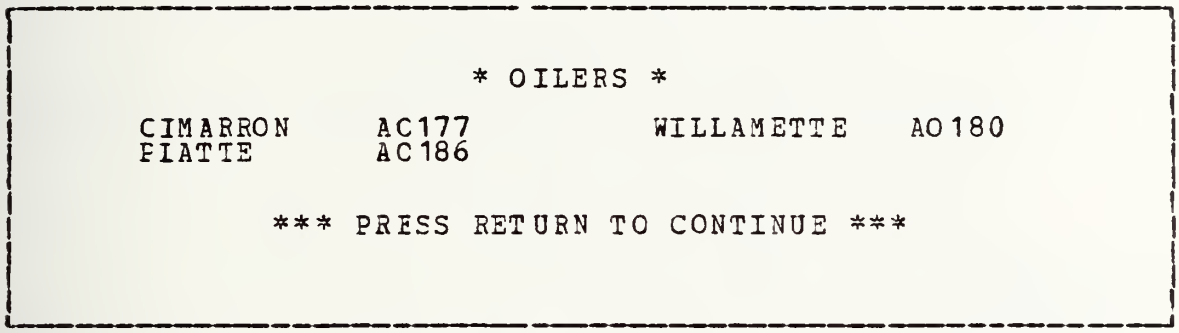

Figure 3.10 OILERS in the Master Database.

When you are through examining the ships in the ship type grouping you have selected, enter the following commands:

KB -- <cr>
VR -- "Carriage Return"

To allow you the opportunity to view another ship type, you will receive the following query.

??? WOULD YOU LIKE TO SEE ANOTHER SHIP TYPE ???

(YES/NO)

Your response to this query would be the following, as applicable

KB -- YES <cr> or NO <cr>
VR -- "Affirmative" or "Negative"

If your response is not to see another ship type, then you will be returned to the Main module. If you

desire tc see another ship type, you will be presented with the DATABASE module menu (Figure 3.8).

Should you inadvertantly make a mistake entering your YES/NO response, ycu will be presented with the fcllcwing.

PLEASE ENTER YES OR NO

At that pcint, simply reenter your YES/NO response.

a. Error in Selecting Ship Type From Menu

Should ycu accidentally make an incorrect entry while making your ship type selection, you will be presented with the fcllowing on the screen.

YOUR SELECTION DOES NOT CORRESPOND TO THE MENU CPTIONS. YOU WILL HAVE TO REENIER.

*** PRESS RETURN TO CONTINUE ***

To continue, make the CARRIAGE RETURN command as described above, and you will be returned to the DATABASE module menu.

G. BUILI MCDULE OPERATIONS

While the MAIN mcdule is the hub of activity between the modules cf ths system, the BUIID module develops the foundation upon which the entire system will operate. Within the BUILD module, the ccmposition of the battle group in determined, unit positions assigned, and the Composite Warfare Commander (CWC) orçanizatien managed. There are twc differentiable segments to the BUILD module. They are oriented arcund whether a battle group database (previously specified by the user) already exists.

When there is nc battle group formed, you will first work within this module to identify the names of the battle

group units, their positions and helicopter embarcation status. Additionally, along the way, you will identify a unit which will function as "ZZ" (Remember that this system requires a battle group unit be at "ZZ."), specify a coordinate system to be utilized, and identify the organizations which will function as warfare commanders. As was mentioned earlier, when you specify a unit's name, its database is automatically obtained unless the ship does not reside in the master database, in which case you would manually enter that data.

Once the battle group has been formed, you would use the BUILD module to INSERT or DELETE a unit, or to REBUILD the entire battle group database. When you exercise the INSERT capability, you would go through the same sequence of queries regarding the unit to be inserted as you did when initially forming the battle group. When you exercise the DELETE capability, as the name implies, you would be removing the information for the specified unit from the battle group database. The REBUILD capability allows you to construct a completely new battle group database.

In the following sections, we will move through the BUILD module and demonstrate the interactions you can anticipate having, The BUILD module is invoked from the query shown in Figure 3.6, as follows.

KB -- BUILD <cr>

VR -- "Build Module"

We will now go through the operations of this module.

1. Initially Forming a Battle Group

For the purposes of our example, we will operate with a three (3) ship battle group consisting of USS CARL VINSON (CVN-70), USS PAUL F FOSTER (DD-964), and USS CALIFORNIA (CGN-36) (a unit not in the master database).

The first view which you will be shown is an explanation of the functions of the module, and is shown in Figure 3.11 (adjusted). This view reiterates much of what we have already discussed about the BUILD module.

```
                BATTLE GROUP ASSET MANAGEMENT
                   DECISION SUPPORT SYSTEM

                         BUILD MODULE

  THIS MODULE WILL ALLOW YOU TO BUILD A DATABASE OF THE
  CAPABILITIES OF THE UNITS IN YOUR BATTLE GROUP.  THESE
  CAPABILITIES WILL INCLUDE ALL SENSOR AND WEAPONS SYS-
  TEMS ONBOARD, AS WELL AS NUMBERS OF UHF/HF RADIOS ON-
  BOARD.  THIS DATA HAS BEEN COMPILED FOR ALL PACIFIC
  FLEET UNITS.  YOU WILL BE ASKED TO PROVIDE THE NAME OF
  EACH UNIT, AND THE COMPUTER WILL LOCATE THE REQUIRED
  DATA FOR THAT UNIT AUTOMATICALLY.  SHOULD A UNIT NOT
  BE IN THIS MASTER DATABASE, YOU WILL BE SO INFORMED
  AND THEN YOU WILL BE ASKED TO PROVIDE THE NECESSARY
  INFORMATION IN A "PROMPT/ANSWER" FORMAT.  YOU WILL NOW
  BE ASKED FOR THE NUMBER OF UNITS IN YOUR BATTLE GROUP,
  AND THEN THE NAME OF EACH UNIT.  PLEASE ANSWER THE
  QUESTIONS AS THEY APPEAR.

          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.11 BUILD Module Discussion.

When you are ready to continue, you would enter the following:

KB -- <cr>

VR -- "Carriage Return"

The next query you will receive is for the number of ships in your battle group.

a. Establishing the Number of Ships in Battle Group

This will be the only time you will be asked for the total number of ships in your battle group. As you operate the system, once this value has been initially entered, it will be automatically kept current by the system. the query for the number of ships in the battle group is shown in Figure 3.12 (adjusted).

```
??? HOW MANY SURFACE COMBATANTS, CARRIER(S), SUBMAR-
INE(S) ARE IN YOUR BATTLE GROUP ???
(ENTER UP TO A MAXIMUM OF 25 SHIPS)
```

Figure 3.12 Query -- Number of Ships in Battle Group.

As the query shows, the range for the required input is 1 - 25 ships. Since our sample battle group has three (3) ships, we would enter the following.

KB -- 3 <cr>
VR -- "Three" "Carriage Return"

If you had ten (10) ships in your battle group, your entry would look like this.

KB -- 10 <cr>
VR -- "One" "Zero" "Carriage Return"

If you inadvertantly make a mistake in making this entry, you would see the following on the screen.

THERE HAS BEEN AN ERROR IN INPUTTING THE NUMBER ON UNITS IN YOUR BATTLE GROUP. YOU WILL HAVE TO REENTER THE NUMBER.

*** PRESS RETURN TO CONTINUE ***

When you are ready to continue, and reenter your number of ships, enter "RETURN,"as described above, and you will again be given the query shown in Figure 3.12.

After you have successfully entered the number of ships in your battle group, you will be given a confirmation of your entry, as shown in Figure 3.13. The statement would show the number of ships you entered, and ask you to confirm that the number is correct. In our example, the number of ships entered was three (3).

```
THERE IS/ARE  3 UNIT(S) IN YOUR BATTLE GROUP.
   ??? IS THIS CORRECT (YES/NO) ???
```

Figure 3.13 Battle Group Size Confirmation.

You should acknowledge the confirmation with the following response, as appropriate.

KB	--	YES <cr>	or	NO <cr>
VR	--	"Affirmative"	or	"Negative"

Should you make an error entering your YES/NO response, you will see the following on the screen.

PLEASE ENTER YES OR NO

Simply reenter your YES/NO response as shown above. Should the number shown in the confirmation statement be incorrect, you will again be given the query shown in Figure 3.12, and the sequence of events described above will be repeated.

b. Ship Name Entry

Once you have identified the number of ships in your battle group, the next step will be to enter their names. Following your confirmation that the number of ships in the battle group is correct, the explanation shown in Figure 3.14 (adjusted) will be displayed.

```
YOU WILL NOW BE ASKED TO ENTER THE NAMES OF THE UNITS
IN YOUR BATTLE GROUP.  A PROMPT "SHIP NAME" WILL AP-
PEAR AFTER WHICH YOU SHOULD ENTER THE NAME OF A UNIT.
REFER TO YOUR USER'S MANUAL UNDER THE "SHIP NAME" LIS-
TINGS FOR THE FORMATS OF THE KEYBOARD OR VOICE ENTRIES
FOR AVAILABLE SHIPS.  FOR KEYBOARD ENTRIES, NAMES ARE
LIMITED TO 19 CHARACTERS WITHOUT ANY COMMAS OR PERI-
ODS.  SPACES BETWEEN WORDS COUNT AS CHARACTERS.  IF
THE NAME OF THE BATTLE GROUP UNIT DOES NOT APPEAR IN
THE USER'S MANUAL, THEN KEYBOARD ENTRY WILL BE RE-
QUIRED, AND VOICE INPUT WILL NOT WORK.

        *** PRESS RETURN TO CONTINUE ***
```

Figure 3.14 Ship Name Entry Explanation.

When you are ready to continue and enter the names of the ships in your battle group, enter "RETURN," as described earlier, and you will receive a "SHIP NAME ?" prompt.

You will receive this prompt a number of times which corresponds to the number of ships you indicated were in your battle group. You should note that if you are entering the information from the keyboard, you are limited to nineteen (19) characters for a ship's name, including spaces. The length of the names of the ships you can enter by voice have already been matched to this requirement. Also note that if the name of a ship in your battle group is not in the master database (as you could confirm in the

DATABASE module discussed earlier), voice entry is not possible. In this situation, the name of the ship would have to be entered from the keyboard. If you did not check the names of your ships in the DATABASE module, you can confirm the names in Appendix A. If the name of a ship is shown in Appendix A, then it will be in the master database.

For our example battle group, the prompts and applicable responses would be as follows:

SHIP NAME ?

KB -- VINSON <cr> or CARL VINSON <cr>
VR -- "VINSON" or "CARL VINSON"

SHIP NAME ?

KB -- FOSTER <cr> or PAUL F FOSTER <cr>
VR -- "FOSTER" or "PAUL F FOSTER"

SHIP NAME ?

KB -- CALIFORNIA <cr>
VR -- (not possible as USS CALIFORNIA is not in the master database)

Should you make an error in entering the name of a ship, you will see the following on the screen. Usually, the only mistake you can make is to enter a name longer than nineteen (19) characters.

YOUR INPUT WAS NOT ACCEPTED BY THE COMPUTER. YOU WILL HAVE TO REENTER THE SHIP'S NAME.

*** PRESS RETURN TO CONTINUE ***

When you are ready, you continue as described earlier, and the "SHIP NAME ?" prompt will appear. You then reenter the name of the ship.

Now that you have entered the names of the ships in your battle group, you will be shown the composition of the battle group that you have entered into the system. This confirmation check is very important. The master database is keyed to the names of the ships, and if the spelling of the names is not exact, then the database will treat the name as if it were not there, and the user will be prompted to build the database entries for that unit as explained later. The system has been programmed to recognize some short form names of ships (e.g. FOSTER for PAUL F FOSTER, or VINSON for CARL VINSON), but you can never go wrong by using the full ship name. Always be sure that you include spaces where they would be appropriate. Figure 3.15 (adjusted) shows the composition of our example battle group for our confirmation.

```
HERE IS A LIST OF THE SHIPS YOU HAVE ENTERED AS YOUR
BATTLE GROUP.  PLEASE CHECK THE LIST FOR ACCURACY AND
SPELLING.

1 CARL VINSON                2 PAUL F FOSTER
3 CALIFORNIA


PLEASE ENSURE THAT THE ABOVE NAMES ARE CORRECTLY
SPELLED.  IF THEY ARE, PRESS CARRIAGE RETURN, OTHER-
WISE, ENTER THE NUMBER OF AN INCORRECT ENTRY AND EN-
TER THE CORRECT SPELLING AFTER THE "SHIP NAME ?"
PROMPT.
```

Figure 3.15 Battle Group Name Listing.

As is directed in Figure 3.15, if the entries are correct, enter "RETURN," (as described earlier), or if not, the number corresponding to the incorrect ship name.

As shown in this case, the list is correct, and we should enter RETURN. As an example, however, let us assume that CARL VINSON was accidentially spelled CARL VINSAN. Since this is incorrect, you would enter the following.

```
KB  --                    1   <cr>
VR  --   "One"  "Carriage Return"
```

You would now see the view shown in Figure 3.16.

```
??? WHAT IS THE CORRECT ENTRY FOR CARL VINSAN     ???
```

Figure 3.16 Correction to Ship Name.

Notice that Figure 3.16 shows the incorrect spelling for the ship. You would now enter the correct spelling for the VINSON (again, subject to the nineteen (19) character limit if from the keyboard), as shown in the following example.

```
KB  --        CARL VINSON   <cr>
VR  --             "CARL VINSON"
```

Once the correction to the ship name has been made, you will again be shown the view in Figure 3.15 to confirm the names of the battle group units. For the purposes of our example, we will assume that it is now correct, and you should enter "RETURN," (as described earlier).

Should you make an error in entering a CARRIAGE RETURN or the number of the ship that is incorrectly spelled, you would see the following on the screen, after which you can make the correct entry.

PRESS CARRIAGE RETURN IF THE LIST IS CORRECT, OR IF NOT, THE APPROPRIATE TWO DIGIT NUMBER

Since the listing was correct, and you entered CARRIAGE RETURN, you will now see an explanation of the operations of the system with respect to the units in your battle group. This information is shown in Figure 3.17. The display of this view also signifies that the master database is being searched for your units and their capabilities are being filed in a battle group database. The units not in the master database will be "flagged" for manual insertion of their capabilities information.

```
THE DATABASE IS BEING SEARCH TO ASSEMBLE THE INFORMA-
TION FOR YOUR BATTLE GROUP.  PLEASE WAIT FOR AN ACK-
NOWLEDGEMENT OF SEARCH COMPLETION PRIOR TO ENTERING
ANY FURTHER DATA.  YOU WILL BE TOLD IF THERE IS A PRO-
BLEM IN LOCATING ANYTHING ABOUT YOUR UNITS.

          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.17 Master Database Search in Progress.

When you are ready to continue, enter CARRIAGE RETURN (as described earlier). You should notice a short delay in the screen refreshing as the master database is searched. If there is no difficulty in searching the master database, then the next query you should see is to determine which unit will function as "ZZ." (This is discussed under Battle Group Position Determination.) If a ship requires manual capability information entry, then you will be so informed. Manual capability insertion is the subject of the next section.

c. Manual Entry of Capabilities

As we designed into our example battle group, USS CALIFORNIA was not a unit in the master database. That being the case, you would see the information shown in Figure 3.18, indicating the units not in the master database, and requiring manual capabilitiy entry.

```
THE FOLLOWING UNITS WERE NOT IN THE MASTER DATABASE
AND WILL REQUIRE MANUAL DATA ENTRY.

CALIFORNIA

SINCE THESE UNITS ARE NOT IN THE MASTER DATABASE, THE
INFORMATION REGARDING THEM WILL HAVE TO BE ENTERED
MANUALLY.  THIS WILL REQUIRE A KNOWLEDGE OF THE TYPE
OF SENSORS AND WEAPONS SYSTEMS ONBOARD.  YOU WILL BE
PRESENTED EQUIPMENT SELECTION/ASSIGNMENT OPTIONS IN
THE FORM OF EASY TO USE MENUS.  IT TAKES APPROXIMATELY
FIVE MINUTES PER SHIP TO ENTER THE DATA.  THIS DATA IS
CRITICAL FOR THE OPERATION OF THE OTHER MODULES OF
THIS DECISION SUPPORT SYSTEM.  WHEN YOU ARE READY TO
CONTINUE, ENTER "YES," AND THE FIRST MENU WILL APPEAR.
```

Figure 3.18 Units Not in the Master Database.

You must enter this information for CALIFORNIA in order for the system database to be complete. When you are ready to continue, enter the following:

KB -- YES <cr>

VR -- "Affirmative"

If you should enter anything other than the YES response, you will see the following.

PLEASE ENTER YES OR NO

When you are ready, and have the required information, enter YES as shown above. We will now follow the sequencing of manual data entry for USS CALIFORNIA.

(1) Hull Number Determination. Determination of the ship's hull number, particularly with respect to the ship type, is very important to the system. The query for this information is shown in Figure 3.19.

```
FOR CALIFORNIA
??? WHAT IS HER HULL NUMBER ???  (MAXIMUM OF SIX CHAR-
    ACTERS  E.G. SSN688, DD980, FF1075, ETC.)
```

Figure 3.19 Query -- Hull Number Determination.

This entry from the keyboard is self-explanatory, remembering that there can be NO blanks or spaces in the hull number as shown in the examples. Figure 3.20 shows the keyboard entry for CALIFORNIA as well as examples for other ship types.

```
CALIFORNIA              CGN36  <cr>

SUBMARINE               SSN688 <cr>
FRIGATE                 FF1078 <cr>
OILER                   AO1077 <cr>
```

Figure 3.20 Hull Number Entry From the Keyboard.

The keyboard entries contrast to those made by voice. The examples shown in Table I are extracts of the information contained in Appendix A.

TABLE I

Ship Type by Voice

SHIP TYPE	SAMPLE VOICE COMMAND
SSN	"Submarine"
CV	"Aircraft Carrier"
CVN	"Nuclear Aircraft Carrier"
CG	"Guided Missile Cruiser"
CGN	"Nuclear Guided Missile Cruiser"
DD	"Destroyer"
DDG	"Guided Missile Destroyer"
FF	"Frigate"
FFG	"Guided Missile Frigate"
AOE	"Fast Combat Support Ship"
AOR	"Replenishment Oiler"
BB	"Battleship"
AFS	"Combat Stores Ship"
AO	"Fleet Oiler"

For the purposes of our example, Figure 3.21 shows the voice input for the hull number of CALIFORNIA. Should you make an error in entering either response, you will see the view in Figure 3.22.

"Nuclear Guided Missile Cruiser" "Three" "Six"
"Carriage Return"

Figure 3.21 Hull Number Entry by Voice.

```
YOU WILL HAVE TO REENTER THIS VALUE.
```

Figure 3.22 Response Error Identification.

(2) Group Assignment Determination. One of the administrative elements of the unit's database is its Cruiser-Destroyer/Carrier Group assignment. This information in the system is not applicable to either Submarines or Service Force units, therefore, if the ship type indicated in the hull number of a unit identifies it as one of these types, this query will not be presented. For our example, the query for the group assignment is shown in Figure 3.23.

```
FOR CALIFORNIA
??? TO WHICH CRUDESGRU OR CARGRU IS SHE ASSIGNED ???
(1, 3, 5, 7, or 9(MIDPAC))
```

Figure 3.23 Query - Group Assignment.

While the query in Figure 3.23 shows "9(MIDPAC)," as a group option, only the "9" is the appropriate response if applicable. Your response should be the appropriate CRUDESGRU/CARGRU number. If CALIFORNIA were assigned to CRUDESGRU 3, the following is the format of the correct entry.

```
KB --                    3    <cr>
VR --    "Three"  "Carriage Return"
```

Should an error occur in making your response, the following will be displayed on the screen.

LIMIT YOUR ANSWER TO 1, 3, 5, 7, or 9

*** PRESS RETURN TO CONTINUE ***

When ready, continue as discussed in earlier examples.

(3) Squadron Assignment Determination. With all destroyer and frigate ship types (as indicated in the hull number), the next query addresses the destroyer squadron assignment. This query will not be presented for non DD/DLG/FF/FFG ship types. The query is shown in Figure 3.24.

Your response to this query can be any one or two digit number reflective of the unit's DESRON assignment. For our example battle group unit, CALIFORNIA, you would not get this query, as the CALIFORNIA is a CGN, a unit not assigned to a DESRON. A sample response to this query for PAUL F FOSTER would be as follows.

```
FOR PAUL F FOSTER
?? TO WHICH DESRON IS SHE ASSIGNED (IF APPLICABLE) ??
```

Figure 3.24 Squadron Assignment Determination.

KE -- 23 <cr>
VR -- "Two" "Three" "Carriage Return"

Should ycu make an error in entering your DESRON assignment, you will see the follcwing:

YCU WILL HAVE TC REENTER THE DESRON ASSIGNMENT

*** PRESS RETURN TO CONTINUE ***

When you are ready, enter CARRIAGE RETURN, then the query shown in Figure 3.24 will be presented, and you shculd reenter ycur response.

(4) Primary/Secondary Missile System Determination. The determination of the primary and secondary missile system capabilities are addressed together. Recognize that a ship may have both a primary and secondary system, only a primary system, cr no missile system capability at all. Figure 3.25 (adjusted) shows the available missile system options. The follcwing will precede the menu for determination of the ship's primary missile system capability. We will use CALIFCRNIA for the sample.

If the ship has no missile system, then you wculd select "NOT APPLICABLE," entering "0". With no primary missile system indicated, you will not be asked about any secondary capability. Should ycu indicate that the ship dces have a primary missile system, then ycu would again receive the query shown in Figure 3.25. This time, the query would be prefaced with the following statements.

FOR CALIFCRNIA

??? WHAT IS HER SECONDARY MISSILE SYSTEM (IF APPLICABLE) ???

In all cases, when responding tc these queries, ycu would indicate the appropriate system for that ship by entering the number tc the left of that capability. Fcr CALIFCRNIA, which has cnly an SM1-MR system, we would

```
FOR CALIFORNIA
      ??? WHAT IS HER PRIMARY MISSILE SYSTEM ???
              * MISSILE SYSTEM OPTIONS *
   0      NOT APPLICABLE
   1      NATO SEASPARROW MISSILE SYSTEM (RIM-7)
   2      STANDARD MISSILE SYSTEM (SM1-ER) (RIM-67)
   3      BASIC POINT DEFENSE MISSILE SYSTEM (RIM-7)
   4      STANDARD MISSILE SYSTEM (SM2-MR) (RIM-66C)
   5      STANDARD MISSILE SYSTEM (SM1-MR) (RIM-66B)
   6      STANDARD MISSILE SYSTEM (SM2-ER) (RIM-67B)
  SELECT 0, 1, 2, 3, 4, 5, or 6
```

Figure 3.25 Query Menu - Missile System Options.

respond to the query regarding the primary missile system as follows.

KB -- 5 <cr>

VR -- "Five" "Carriage Return"

Since we indicated that CALIFORNIA has a primary missile system, then the query for her secondary missile system capability will be presented. CALIFORNIA has no secondary missile system, therefore, the response would be as follows.

KB -- 0 <cr>

VR -- "Zero" "Carriage Return"

Should an error occur in entering either of these values (primary/secondary capability), you will see the following.

YOU MUST LIMIT YOUR CHOICES TO 0, 1, 2, 3, 4, 5, or 6

*** PRESS RETURN TO CONTINUE ***

Continue as discussed earlier, and the appropriate preface (primary/secondary) along with the missile system options will appear. Make your selection as demonstrated.

(5) Harpoon Capability Determination. The next query with which you will be presented will address the ship's Harpoon weapons system capability. The query is shown in Figure 3.26.

```
FOR CALIFORNIA
??? IS THIS UNIT HARPOON CAPABLE ???   (YES OR NO)
```

Figure 3.26 Query - Harpoon Capability.

The intent of this capability determination is to confirm not only that the ship is capable of having the Harpoon system, but also has the weapons onboard. As we will see later, this is not a "one time" entry. Within the STATUS module is a capability to CHANGE any item in the ship's database, and therefore allow for a real time maintenance on onboard weapons. Your response would be the following, as appropriate.

KE -- YES <cr> or NO <cr>
VR -- "Affirmative" or "Negative" "

If you make a mistake in entering your YES/NO response, you will see the following, after which you simply reenter your response.

PLEASE ENTER YES OR NO

(6) Primary/Secondary Air Search Radar Determination. Similar to the missile system capability determination, the same menu is utilized for determination of the primary/secondary air search radar capability. Figure 3.27 shows the composition of the menu. As you have seen before, the menu will be prefaced by the appropriate declaration of which capability (primary or secondary) is being solicited. The query for the ship's primary capability is reflected in Figure 3.27. As CALIFORNIA has an AN/SPS-48C, the following would be entered in response to this query.

KB -- 1 <cr>

VR -- "One" "Carriage Return"

```
FOR CALIFORNIA
    ??? WHAT IS HER PRIMARY AIR SEARCH RADAR ???
            * AIR SEARCH RADAR OPTIONS *
      0 -- NONE                  6 -- AN/SPS-37A
      1 -- AN/SPS-48C            7 -- AN/SPS-52
      2 -- AN/SPS-49             8 -- AN/SPS-40
      3 -- AN/SPS-65             9 -- AN/SPS-39
      4 -- AN/SPS-58            10 -- AN/SPY-1
      5 -- AN/SPS-43A
SELECT ONE OF THE ABOVE
```

Figure 3.27 Query Menu - Air Search Radar Options.

Once the primary air search radar has been determined, the query for the ship's secondary capability will be presented. As you have seen before, if you indicate that the ship has NO primary capability, then the query for the secondary capability will not be presented. If you indicate a primary capability, then the following preface will appear.

FOR CALIFORNIA

WHAT IS HER SECONDARY AIR SEARCH RADAR (IF APPLICABLE)

The manner in which the capability is entered is the same for the secondary capability, and is shown in the following example, indicating CALIFORNIA has an AN/SPS-40 for a secondary air search radar.

KB -- 8 <cr>
VR -- "Eight" "Carriage Return"

Should an error occur in entering either the primary or secondary capability, the the warning shown in Figure 3.28 will be presented. On receiving such a warning, simply enter CARRIAGE RETURN, and the appropriate preface, followed by the menu will appear. Then reenter your response.

```
YOU WILL HAVE TO REENTER YOUR RESPONSE FROM THE MENU OPTIONS.

          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.28 Warning - Response Not From Menu Options.

(7) Surface Search Radar Determination. Figure 3.29 shows the query you will be presented with for the determination of the ship's surface search radar.

CALIFORNIA has an AN/SPS-10 onboard, therefore, the correct response would be as follows.

KB -- 3 <cr>

```
FOR CALIFORNIA
  ??? WEAT IS HER SURFACE SEARCH RADAR CAPABILITY ???

          * SURFACE SEARCH RADAR OPTIONS *

                    0 -- NONE
                    2 -- AN/BPS-15
                    3 -- AN/SPS-10
                    4 -- AN/SPS-55
                    5 -- AN/SPY-1

  SELECT ONE OF THE ABOVE
```

Figure 3.29 Query -- Surface Search Radar.

VR -- "Three" "Carriage Return"

(8) Primary/Secondary Fire Control Radar Determination. Particularly important for the combatants (non-Service Force ships) is the specification of their fire control radar capability. As the system addresses both primary and secondary capabilities, the procedures for entering this information are similar to those utilized with missile systems and air search radars. Figure 3.30 shows the menu options for fire control radars. The query for determination of the primary capability is is reflected in Figure 3.30.

Your response would be the number corresponding to the system you desire. If you indicate that the ship does not have a primary capability, as you have seen before, you will not be presented with the query for the secondary capability. A correct response would look like the following.

KB -- 2 <cr>

VR -- "Two" "Carriage Return"

```
FOR CALIFORNIA

??? WHAT IS HER PRIMARY FIRE CONTROL RADAR (IF APPLI-
CABLE) ???
          * FIRE CONTROL RADAR OPTIONS *

        0 -- NONE              10 -- MK-99
        1 -- MK-91             11 -- MK-74
        2 -- AN/SEG-55A        12 -- MK-68
        3 -- AN/SPG-49         13 -- MK-92
        4 -- AN/SPW-2          14 -- AN/SPG-53
        5 -- MK-40             15 -- AN/SPG-60
        6 -- AN/SEG-51         16 -- MK-13
        7 -- MK-7              17 -- AN/SPQ-9
        8 -- MK-76             18 -- AN/SPG-35
        9 -- MK-56

SELECT ONE OF THE ABOVE
```

Figure 3.30 Query Menu - Fire Control Radar Options.

If you indicate a primary capability, the query for the secondary capability will appear with the following prefacing the menu options.

```
FOR CALIFORNIA

  WHAT IS HER SECONDARY FIRE CONTROL RADAR (IF APPLICABLE)
```

The response for the secondary capability is of the same format as the primary. Should an error occur in entering your response, you will see the warning shown in Figure 3.28. As was discussed, when ready, enter CARRIAGE RETURN and the appropriate preface and menu will appear. Reenter your response.

(9) UHF/HF Radio Capability Determination. One of the important capabilities of the system is to display the communications links within the battle group. This is done in the COMMS module. The graphics displays of the nets is color coded to show not only the relative

distance between participating units, but also their respective radio requirements based on mission area. The dynamics of the status of communications equipments makes this a good indicator of C3 performance. The base for the determination of the available radios onboard is the attrition applied to installed numbers of those radios. This number of installed radios is the value desired in this query. The system will differentiate between UHF and HF radios. The query/response sequence is straightfoward. The query for the number of installed UHF radios is shown in Figure 3.31.

```
FOR CALIFORNIA
  ??? HOW MANY UHF RADIOS DOES SHE HAVE ONBOARD ???
(RANGE 1 TO 99)
```

Figure 3.31 Query - UHF Radio Capability.

Identical to the format for the UHF query, the query for the numbers of installed HF radios is shown in Figure 3.32.

The response to either if these queries is of the same format and an example is as follows.

```
KB --                              15    <cr>
VR --   "One" "Five" "Carriage Return"
```

If your response is not within the range specified (1 - 99), then you will see the warning shown in Figure 3.33 on the screen.

```
FOR CALIFORNIA
??? HOW MANY HF RADIOS DOES SHE HAVE ONBOARD ???
(RANGE 1 TO 99)
```

Figure 3.32 Query - HF Radio Capability.

```
YOU WILL HAVE TO REENTER THIS NUMBER
*** PRESS RETURN TO CONTINUE ***
```

Figure 3.33 ERROR in Entering Integer value.

After you enter CARRIAGE RETURN, the applicable query will reappear and you can reenter your response.

(10) Satellite Communications Capability Determination. To complete the database for the communications capabilities of the ship, you need to identify the ship's satellite comm capability. This is very straightfoward, and the query is shown in Figure 3.34 (adjusted). To give the ship a capability indicated in the menu, simply enter the number corresponding to the equipment desired.

If you desire to indicate that CALIFORNIA has an AN/WSC-3 onboard, your response would look like the following example.

KB -- 1 <cr>

```
FOR CALIFORNIA
??? WHAT SATELLITE COMMUNICATIONS CAPABILITY DOES SHE
HAVE ???
                    0 -- NONE
                    1 -- AN/WSC-3
                    2 -- OE-82
SELECT 0, 1, CR 2
```

Figure 3.34 Query - Satellite Communications Capability.

VR -- "One" "Carriage Return"

Should you make an error in entering this response, then the warning shown in Figure 3.28 will appear. After you enter CARRIAGE RETURN, the SATCOM menu will reappear, and you can reenter your response.

(11) Gun System Capability Determination. The next input to the ship's database is her gun weapons system capability. Figure 3.35 (adjusted) shows the query menu with the available gun options.

CALIFORNIA has a 5"/54 MK45 gun. The following is an example of how we would enter this information.

KB -- 5 <cr>

VR -- "Five" "Carriage Return"

The warning shown in Figure 3.28 will appear if your response is not within the range of the menu options (0 - 7). After you enter CARRIAGE RETURN, the query menu will appear and you can reenter your response.

```
FOR CALIFORNIA
??? WHAT IS HER GUN WEAPONS SYSTEM CAPABILITY ???
              * GUN SYSTEM OPTIONS *

          0 -- NOT APPLICABLE
          1 -- 16"/50 (406 mm) MK7  MOD 0
          2 -- 5"/38 (127 mm) MK12 MOD 1
          3 -- 2mm/70          MK4
          4 -- 5"/54 (127 mm) MK42
          5 -- 5"/54 (127 mm) MK45
          6 -- 3"/50 (76 mm)  MK22
          7 -- 76 mm (OTO MELARA)

SELECT ON OF THE AEOVE
```

Figure 3.35 Query - Gun System Options.

(12) PHALANX Capability Determination. The query shcwn in Figure 3.36 requests the number of PHALANX systems the ship has onboard. The number of systems can range frcm zero (0) through normally, four (4).

```
FOR CALIFORNIA
   ??? HOW MANY PHALANX SYSTEMS DOES SHE HAVE ???
```

Figure 3.36 Query - PHALANX Capability.

To indicate that CALIFORNIA has three (3) PHALANX systems onboard, the fcllowing entry would be made. Should an error occur in making this entry, the warning shown in Figure 3.33 will appear, and when you continue, the query will again come up, and you cna reenter your respcnse.

KB -- 3 <cr>

VR -- "Three" "Carriage Return"

(13) TOMAHAWK Capability Determination. While the TOMAHAWK weapons system is relatively new to the fleet, this capability will become increasingly available in upcoming years. To ensure that this DSS has the ability to display the TOMAHAWK capability, this solicitation for information will be presented. The query shown in Figure 3.37 requests the ship's TOMAHAWK capability. In the case of our example, CALIFORNIA, she does not have this capability.

```
FOR CALIFORNIA
    ??? IS SHE TOMAHAWK CAPABLE ???   (YES OR NO)
```

Figure 3.37 Query - TOMAHAWK Capability.

There is a difference in the intent of this query as opposed to that of the HARPOON capability. With TOMAHAWK, it is assumed that since few ships have this capability, those that do will have the weapons onboard. Therefore, a "YES" response to this query should mean that the ship in question has not only the capability, but also the weapons. Your response would be the following as applicable.

KB -- YES <cr> or NO <cr>
VR -- "Affirmative" or "Negative"

Should an error occur in making this response, you would see the following on the screen.

PLEASE ENTER YES OR NO

(14) Helicopter Capability Determination. The helicopter, as a surveillance vehicle or a weapons platform is becoming invaluable to the battle group. The query, shown in Figure 3.38, requests information on the helicopter capability of the ship in question. The four helo types, present in a battle group are shown as options. Once the capability has been affirmed, then you will be asked whether the the ship actually has its detachment onboard.

```
FOR CALIFORNIA
      ??? WHAT IS HER HELICOPTER CAPABILITY ???
                  * HELO OPTIONS *
                1 -- NOT CAPABLE
                2 -- HC DET (CH-3)
                3 -- HS DET (SH-3)
                4 -- HC DET (CH-46)
                5 -- HSL DET (SH-2)
```

Figure 3.38 Query - Helicopter Capability Determination.

For CALIFORNIA, which has a LAMPS capability, your response would be the the follcwing.

KB -- 5 <cr>

VR -- "Five" "Carriage Return"

Once the capability has been determined to exist, you will receive a query regarding the embarcation status of the detachment. This query is tailored to the type of capability you gave the ship. For our example, Figure 3.39 shows the query.

```
??? DOES CALIFORNIA HAVE HER LAMPS DET ONBOARD ???
(YES OR NO)
```

Figure 3.39 Query - LAMPS Embarcation Status.

As was mentioned, this query is tailored to the type of capability you gave the ship. If you had indicated that the ship had an HC DET (CH-46) capability, then the following would be the query for the embarcation status.

??? DOES <SHIP> HAVE HER "CH46" DET ONBOARD ???

(YES OR NO)

There are similar matches for each capability listed in Figure 3.38.

At this point, an additional capability of the system needs to be addressed. We will discuss in the STATUS module operations, the capability you will have to change any item in the ship's database once the battle group has been established. That capability utilizes the same menus and prefaces as does the module in which we are working. While that capability will be covered in more depth later (under STATUS Module Operations), reference will regularly be made to these sections for explanation of the queries and appropriate responses with respect to the menus. When dealing with the helicopter embarcation status CHANGE ONLY, there is a warning that could appear if you attempt to embark a helicopter detachment on a ship to which there has been given NO helo capability. In this case, the warning shown in Figure 3.40 will be presented.

```
BASED ON THE INFORMATION IN THE DATABASE, THIS UNIT IS
NOT HELO CAPABLE.  YOU WILL HAVE TO FIRST GIVE HER THE
CAPABILITY.

          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.40 Warning - Ship Not Helo Capable.

This situation is not possible when working in the BUILD module, which we are discussing, as you will not be queried on the embarcation status of a ship to which you gave no helo capability.

Should an error occur in making the response regarding the capability, the warning shown in figure 3.28 will appear. After you continue, you will again be presented with the menu, and can reenter your response. Should an error occur when you are making your response regarding the embarcation status, you will see the following on the screen.

PLEASE ENTER YES OR NO

At this point, simply reenter yor YES/NO response.

(15) Sonar/IVDS Capability Determination. The query for the ship's sonar capability, shown in Figure 3.41, will not be presented for the Aircraft Carriers, or Service Force ships. Also, the assignment of the sonar capability is important because in the SENSOR module, some of the sonars are "flagged" as being capable for convergence zone operations, and that capability will be displayed if you indicate that those conditions exist.

```
FOR CALIFORNIA
        ??? WHAT IS HER SONAR CAPABILITY ???
                * SONAR OPTIONS *
    0 -- NOT CAPABLE          6 -- AN/BQS-12
    1 -- AN/BQC-5             7 -- AN/SQS-23
    2 -- AN/BQS-15            8 -- AN/SQS-26
    3 -- AN/BQC-2             9 -- AN/SQQ-23
    4 -- AN/BQS-6            10 -- AN/SQS-53
    5 -- AN/BQR-7            11 -- AN/SQS-56
```

Figure 3.41 Query - Sonar Options.

You would indicate the sonar capability be entering the number corresponding to the equipment desired. For CALIFORNIA, which has an AN/SQS-53 sonar, your response would look like the following.

KB -- 10 <cr>

VR -- "One" "Zero" "Carriage Return"

Should an error occur in making this response, the information shown in Figure 3.28 would appear. When you continue, Figure 3.41 will reappear, and you can reenter your response.

The IVDS capability determination is straightforward, and requires only a YES/NO answer. The query for this information is shown in Figure 3.42.

CALIFORNIA does not have this capability, therefore we would enter NO. The response, in general, would be the following as applicable.

KB -- YES <cr> or NO <cr>

VR -- "Affirmative" or "Negative"

```
FOR CALIFORNIA
??? DOES SHE HAVE AN IVDS CAPABILITY ???   (YES OR NO)
```

Figure 3.42 Query - IVDS Capability.

Should you make an error in responding, you will be directed to enter your YES/NO response again, as we have seen earlier.

(16) TASS Capability Determination. The determination of the TASS capability applies to only to submarines, destroyers, cruisers and frigates. This query will not be presented for ships not in those ship types. Figure 3.43 shows the composition of the query.

```
FOR CALIFORNIA
        ??? WHAT IS HER TASS CAPABILITY ???
         0 -- NOT APPLICABLE
         1 -- AN/SQR-19 (IMPROVED TACTASS)
         2 -- AN/SQR-18 (TACTASS)
```

Figure 3.43 Query - TASS Capability.

The response to this query is the number corresponding to the desired capability. CALIFORNIA does not have this capability, therefore the response would be as follows.

KB -- 0 <cr>

VR -- "Zero" " Carriage Return"

Should an error occur in making this response, then the warning shown in Figure 3.28 will be presented. After you continue, the TASS Capability menu will again be presented, and you can reenter your response.

(17) ASW Rocket/Torpedo Capability Determination. The determination of the ASW weapons capability for the units of the battle group is discussed together. These capabilities are not applicable to aircraft carriers and service force ships, and therefore the queries will not be presented for those units. The composition for the query for determination of the ASW rocket capability is shown in Figure 3.44.

```
FOR CALIFORNIA
      ??? WHAT IS HER ASW ROCKET CAPABILITY ???

                N -- NOT APPLICABLE
                A -- ASROC
                S -- SUBROC
```

Figure 3.44 Query - ASW Rocket CApability.

This is the first query menu that requires a response that is a character and not a number. Also, there is no system check of the input you make, so, you could give a SUBROC (a submarine weapon) to a surface ship. This fact is mentioned not to encourage you to do this, but rather to alert you to the possibility of error without system correction. The response desired is made by entering the character corresponding to the desired capability. CALIFORNIA has an ASROC capability, therefore the response would be as follows.

KB -- A <cr>

VR -- "ASROC" "Carriage Return"

The system looks for a response that has no numbers and either the "N," "A," or "S" characters. Should your response not be any of those inputs, then you will see the warning shown in Figure 3.28. After you continue, the menu will be again presented, and you can reenter your response.

The determination of the ship's torpedo capability is similar to other queries you have seen. The composition for the query is shown in Figure 3.45.

```
FOR CALIFORNIA
        ??? WHAT IS HER TORPEDO CAPABILITY ???
                0 -- NOT APPLICABLE
                1 -- MK46
                2 -- MK48
```

Figure 3.45 Query - Torpedo Capability.

The input should be the number corresponding to the desired capability. CALIFORNIA has a MK46 torpedo capability, therefore, the correct response would be as follows.

KB -- 1 <cr>

VR -- "One" " Carriage Return"

Should an error occur in making this response, the the warning shown in Figure 3.28 will be presented. After you continue, the menu will be again presented and you can reenter your response.

(18) Maximum Speed Determination. The desired value of this input is the designed maximum speed for the ship in question. In the CHANGE function of the STATUS module, this value can be kept current, as a real time indicator of the ship's mobility capability. In the STATUS module, you can adjust this value as the situation dictates. The composition for the query is shown in figure 3.46 .

```
FOR CALIFORNIA
      ??? WHAT IS HER MAXIMUM SPEED IN KNOTS ???
(RANGE 1-40 KNOTS)
```

Figure 3.46 Query - Maximum Speed Capability.

The response to this query should be the ship's maximum speed, within the range given (1-40 knots). The CALIFORNIA has an unclassified maximum speed of 33 knots, and this information would be input as follows.

```
KB --                              33      <cr>
VR --  "Three" "Three" "Carriage Return"
```

The system will check the input to ensure that it is within the allowable range. Should the input not be within this range, the warning shown in Figure 3.33 will be presented. After you continue, the query shown in Figure 3.46 will again be presented, and you can reenter your response.

(19) SLQ-32 Capability Determination. The composition of the query for a ship's SLQ-32 capability is shown in Figure 3.47. The required input is a YES or NO response.

```
FOR CALIFORNIA
     ??? DOES SHE HAVE AN SLQ-32 CAPABILITY ???
(YES OR NO)
```

Figure 3.47 Query - SLQ-32 Capability.

CALIFORNIA does not have this capability, therefore the correct response would be NO. As applicable to the particular ship, the response would be as follows.

KB	--	YES	<cr>	or	NO <cr>
VB	--	"Affirmative"		or	"Negative"

Should an error occur in making this response, the following statement will appear.

PLEASE ENTER YES OR NO

If this occurs, simply reenter your YES/NO response.

(20) Primary/Secondary Mission Determination. The same menu is utilized for the determination of both the primary and secondary missions of a ship. Figure 3.49 shows the composition of this menu. The specific mission desired (primary or secondary) will be specified in a preface to the menu. The preface for the determination of the ship's primary mission is shown in Figure 3.48. For the purposes of this system, every ship MUST have a primary mission. Therefore, you will not be allowed to enter "NOT APPLICABLE" for a ship's primary mission.

```
FOR CALIFORNIA
        ??? WHAT IS HER SECONDARY MISSION ???
```

Figure 3.50 Query - Secondary Mission Area.

This query would be followed by the mission options shown in Figure 3.49. The CALIFORNIA has a secondary mission of ANTI-SUBMARINE WARFARE, therefore the correct input for secondary mission area would be as follows.

KB -- ASW <cr>
VR -- "Anti-Submarine Warfare"

The system will attempt to match your response to those options shown in the menu, and if there is no match, an error will occur. Should this happen, the warning shown in Figure 3.28 will be presented. After you continue, the applicable query will again be presented, and you can reenter your response.

d. Completion of Database Assembly

The complete sequence of capability menus, as applicable to the ship types in question, will be presented for all ships listed in the view shown in Figure 3.18. Once these capabilities have been compiled for all of the ships in the battle group, whether it be done automatically or manually, you are ready to proceed to the next phase of Initially Forming the battle group database, determination of the positions of the ships. This is the topic of the next section.

e. Establishing Unit Positions

Now that the names and capabilities of the ships which will comprise the battle group have been determined, the next information required by the system is the position of each ship. There are generally three segments to this section of the BUILD module. First, the unit which will be in "ZZ" will be determined. Remember that for the purposes of this system, a battle group ship must be at "ZZ." Next, the type of coordinate system to be used (polar or cartesian), will be determined. Finally, the positions for the individual ships will be input. Let's first look at determining the unit to be at "ZZ."

(1) Determination of "ZZ" unit. The specification of the unit to be at "ZZ" is critical to the operation of the remainder of the modules in the system. It is with respect to this unit that all of the computer graphics coordinates for each ship will be calculated. The calculation of those graphics coordinates is done by the system and will be transparant to you. The only information required will be the normally assigned ship positions, in terms of the coordinate system you select, and the system will adapt those positions for graphics use. Irrespective of the coordinate system you specify, the position of the unit at "ZZ" will have to be input in cartesian coordinates, as these adapt more readily to graphics coordinates. This query will be discussed shortly.

The query shown in Figure 3.51 addresses the determination of the unit to be at "ZZ." As you will now see throughout the remainder of this Decision Support System, whenever a requirement is levied to name a particular unit of the battle group, there will be a current listing of the battle group provided along with the query. This listing shows all of the battle group units as the

system has filed their names. Figure 3.51 shows the composition of our example battle group to assist you in identifying the unit you desire.

```
??? WHICH UNIT WILL FUNCTION AS ZZ ???
CARL VINSON     PAUL F FOSTER     CALIFORNIA
```

Figure 3.51 Query - Name of ZZ Unit.

The listing of ships will always be in three columns. Since there are only three ships in the example battle group, there is only one line. As you found when you entered the names of the ships earlier, the spelling of the name is critical for the system to recognize the entry. Every time there is a request for identification of a unit, the system will attempt to match the input name to those in the battle group. Should a match not occur, then you will be asked to reenter the response. In order to use the name of a unit, for any function, it must be first INSERTed into the battle group database, as we have already done for our three example ships. Even though the listing shows "PAUI F FOSTER," the system has been programmed to recognize "FOSIER" as an acceptable version for the same ship. This is also true for "CARL VINSON", as the system will recognize "VINSON" as the same ship. In general, this applies to all ships with two or more words in their names. The last name of the ship has been programmed to be an alternatively acceptable name representation. These differences, in reality, apply both to keyboard as well as voice entry.

For voice entry, refer to Appendix A for a detailed listing of all legitimate ship names and their variations. Let's assign the CARL VINSON to "ZZ." The correct response would be as follows.

KB -- CARL VINSON <cr> or VINSON <cr>
VR -- "CARL VINSON" or "VINSON"

If there was a mechanical error in making this entry, then the following alert would be displayed.

PLEASE REENTER THE NAME OF THE ZZ UNIT AGAIN

If there had not been a match of the input name with those of the listing (for example if you had input NIMITZ), then

```
YOUR ENTRY FOR ZZ NIMITZ DOES NOT MATCH ANY OF THE
SHIP NAMES IN YOUR BATTLE GROUP.  PLEASE CHECK THE
SPELLING AND COMPLETENESS OF YOUR ENTRY.

        *** PRESS RETURN TO CONTINUE ***
```

Figure 3.52 ERROR - ZZ Name Not Matched To Listing.

you would be shown the warning shown in Figure 3.52.

When you continue, you will again be presented with the query shown in Figure 3.51, and you can reenter your response.

The next query you will see is for determination of the coordinate system to be utilized.

(2) Determination of Coordinate System. There are two choices for coordinate systems on which to base your ship's positions, polar or cartesian. The query which addresses the coordinate system is shown in Figure 3.53 (adjusted).

```
YOU WILL NOW BE ASKED FOR THE POSITION OF EACH UNIT IN
THE BATTLE GROUP.

??? WOULD YOU LIKE TO USE POLAR OR CARTESIAN POSI-
TIONS ???

(ENTER "POLAR" OR "CARTESIAN")
```

Figure 3.53 Query - Coordinate System.

The format of the response to this query, as well as the query sequences which respectively follow each response option are shown in subsequent sections. Should you make an error in entering the response to the query shown in Figure 3.53, the following will be presented.

PLEASE ENTER "POLAR" OR "CARTESIAN"

Remember not to include the quotes. Once the type of coordinate system has been specified, you are asked for the cartesian position of the unit at "ZZ" (CARL VINSON, in our example). This query is shown in Figure 3.54.

```
FOR CARL VINSON

??? WHAT IS HER POSITION IN CARTESIAN COORDINATES ???

(ENTER AS QUADRANT (R,W,E,G), SPACE, X-POSITION, SPACE,
Y-POSITION)

(E.G. W 030 090)
```

Figure 3.54 Query - Cartesian Position of ZZ Unit.

The format of the response to this query, and the corrections to any errors which you might encounter in making this response, are identical to those which you see for the input of a cartesian position for any other ship. Please refer to the section on Query Sequences -- Cartesian Coordinate System, below. This will be the only time you are asked for the position of the unit at "ZZ," unless you delete this unit from the battle group, in which case you will have to reinitiate the position determination sequences. We will now look at the sequences which you will encounter based on the type of coordinate system you specify.

(3) Query Sequences -- Polar Coordinate System. In response to the query shown in Figure 3.53, if you desire to input battle group positions in polar coordinates, the correct format for the response would be as follows.

KB -- POLAR <cr>
VR -- "Polar Coordinate System"

Once you have selected this coordinate system, you will be sequence through each ship (less the unit at "ZZ"), being queried for its bearing and range from "ZZ." You will first be asked for the ship's bearing from "ZZ," in degrees true. Next, you will be asked for the ship's range from "ZZ," in YARDS. After you have entered a ship's position, that position will be presented to you for confirmation. The initial query is shown in Figure 3.55.

If PAUL F FOSTER were bearing 090 degrees true from "ZZ," then the correct response to this query would be as follows.

KB -- 090 <cr>
VR -- "Zero" "Nine" "Zero" "Carriage Return"

```
FOR PAUL F FOSTER

    ??? WHAT IS HER BEARING AND RANGE FROM ZZ ???
??? BEARING ???
(ENTER AS THREE DIGITS 000-359)
```

Figure 3.55 Query - Ship's Bearing From ZZ.

The system will check the input against the authorized range (000-359), and should the input not be within this range, then the following warning will be presented.

PLEASE ENTER AS THREE DIGITS (000-359), WITHOUT COMMAS OR DECIMAL POINTS

*** PRESS RETURN TO CONTINUE ***

When you continue, you will again be presented with the query shown in Figure 3.55, and you can reenter your response.

You will next be asked to indicate the ship's range from "ZZ." This range input should be in yards, and entered without any commas or decimal points. The query is shown in Figure 3.56.

As an example, PAUL F FOSTER is 50,000 yards (25 nm) from "ZZ." The correct response to this query would be as follows.

KB -- 50000 <cr>
VR -- ""Five" "Zero" "Thousand"

Should an error occur in making this entry, the warning shown in Figure 3.57 would be presented.

```
FOR PAUL F FOSTER
??? WHAT IS THE SHIP"S RANGE FROM ZZ ???     (IN YARDS)
(ENTER AS SIX DIGITS WITHOUT COMMAS OR DECIMAL POINTS
 E.G. 10,000=10000    RANGE LIMITS 0 TO 600,000 YARDS)
```

Figure 3.56 Query - Range From ZZ.

```
PLEASE ENTER THE RANGE AS SIX DIGITS WITHOUT COMMAS OR
 DECIMAL POINTS.
(E.G. 5,000=5000, 500,000=500000, ETC.)
          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.57 ERROR - Range Input.

When you continue, the query for range (Figure 3.56) will again be presented, and you can reenter your response. The system will also check your input against the range limits (0 to 600,000 yards). Should your input not be within these limits (for example 700000 was input), then the warning shown in Figure 3.58 will be presented. As with other error corrections, when you continue, the original query will be presented, and you can reenter your response.

Once the bearing and range have been correctly input, the values are presented to you for confirmation. The format for this confirmation is shown in Figure 3.59, and requires a YES/NO response.

```
YOU HAVE ENTERED 700000 AS THE RANGE AS THIS UNIT'S
RANGE, AND THIS IS NOT WITHIN THE RANGE LIMITS.
```

Figure 3.58 ERROR - Range Outside Prescribed Limits.

```
PAUL F FOSTER IS BEARING  90 DEGREES TRUE AND RANGE
50000 YARDS FROM 22.
        ??? IS THIS CORRECT ???   (YES/NO)
```

Figure 3.59 Query - Bearing/Range Confirmation.

The following is the correct response to this query as applicable.

KE -- YES <cr> or NO <cr>
VR -- "Affirmative" or "Negative"

Should a mistake occur in making this response you will see the following:

PLEASE ENTER "YES" OR "NO"

Simply reenter your YES/NO response. If you enter "YES," then you will either sequence to the next ship requiring position input, or if no more ships require positions, you will move to the next section of the BUILD module, establishing the Composite Warfare Commander (CWC) Organization. If you had entered NO to the position confirmation query, then the query shown in Figure 3.55 would again be presented, and you would repeat the position entry sequence for that ship.

(4) Query Sequence -- Cartesian Coordinate System. In response to the query shown in Figure 3.53, if you desire to input the positions of the battle group units in cartesian coordinates, then you would enter the following.

KB -- CARTESIAN <cr>
VR -- "Cartesian Coordinate System"

You would then be queried for the cartesian positions of each ship in the battle group (less the unit at "ZZ"). The format for the specification of the position is Quadrant, X-Coordinate, Y-Coordinate. Each of these entries is seperated by a space, as shown in the query example. The composition of the query is shown in Figure 3.60.

```
FOR PAUL F FOSTER
??? WHAT IS HER POSITION IN CARTESIAN COORDINATES ???
(ENTER AS QUADRANT (R,W,B,G), SPACE, X-POSITION,
SPACE, Y-POSITION)
(E.G. W 030 090)
```

Figure 3.60 Query - Cartesian Position.

To demonstrate the correct format for the cartesian position input, let's give PAUL F FOSTER the position WHITE 150 100. Particularly when entering your response from the keyboard, it is important to conform exactly to the format for the response. There can be NO extra spaces. When making the input by voice, while the input command has some length, this is not a problem when you follow the example.

KB -- W 150 100 <cr>

VR -- "White" "One" "Five" "Zero" "Space" "One" "Zero" "Zero" "Carriage Return"

One of the first things that the system checks in the input is that the quadrant is one of the four options. If the quadrant response is other that R, W, B, or G, then the warning shown in Figure 3.61 will be presented. For example, let's say you accidentally entered "K" as the quadrant.

```
YOU HAVE ENTERED "K" AS THE QUADRANT, WHICH IS NOT R,
W, B, OR G
        *** PRESS RETURN TO CONTINUE ***
```

Figure 3.61 ERROR - Cartesian Quadrant.

When you continue, you will be presented with the instruction shown in Figure 3.62.

```
PLEASE REENTER THE POSITION: QUADRANT (R,W,B,G),
SPACE, X-POSITION, SPACE, Y-POSITION
(E.G. R 300 200)
        *** PRESS RETURN TO CONTINUE ***
```

Figure 3.62 ERROR - Cartesian Position Entry.

It may seem like overkill, but when you continue, you will again be presented with the query shown in Figure 3.60.

You can then reenter your cartesian position for the unit in question. Once the position has been entered correctly, the system will present the quadrant and X/Y positions back to you for confirmation. This display is shown in Figure 3.63.

```
THE CARTESIAN POSITION OF PAUL F FOSTER IS: W 150 100
        ??? IS THIS CORRECT ???     (YES/NO)
```

Figure 3.63 Query - Confirmation of Cartesian Position.

The correct response to this query would be "YES," as this is the correct position for FOSTER. In general, the correct response to this query would be as shown below, as applicable.

KB	--	YES <cr>	or	NO <cr>
VR	--	"Affirmative"	or	"Negative"

If you enter YES to the query shown in Figure 3.63, then you will be asked for the position of the next ship in the battle group, or if all ships have been assigned positions, then you will move to the next phase of the BUILD module, establishing the Composite Warfare Commander (CWC) Organization.

f. Establishing the Composite Warfare Commander (CWC) Organization

The next phase in the initialization of a battle group database is the establishment of the CWC organization.

The information shown in Figure 3.64 will be presented to you as an introduction.

```
YOU WILL NOW ASSIGN NAMES AND EMBARKED UNITS FOR EACH
WARFARE COMMANDER.  NAMES CAN BE ENTERED TO A MAXIMUM
OF 25 CHARACTERS.  SOME EXAMPLES ARE AS FOLLOWS:

                    CCMCARGRU 1
                    COMDESRON 9
                    CCMDESFCN 23
                    CO, PAUL F FOSTER
                    CO, MERRILL

YOU CAN INCLUDE THE COMMAS, HOWEVER BE CAREFUL IF YOU
ARE ENTERING BY VOICE TO FOLLOW THE USER'S MANUAL NAME.
IF THE NAME IS NOT IN THE USER'S MANUAL, THEN MANUAL
NAME ENTRY WILL BE REQUIRED.
```

Figure 3.64 Introduction to CWC Organization Determination.

Within this section of the BUILD module, you will identify the organizations which will function as each of the warfare commanders/coordinators, and identify on which ships they are embarked. Table II gives examples of the types of organizations which could function as a warfare commander or coordinator. The table additionally shows the acceptable entries for those organizations.

The full scope of the sequence establishing the CWC organization is, determination of the organization functioning as the warfare commander/coordinator, determination of the unit on which the organization is embarked, and finally a display of the full CWC Organization for your confirmation. For the first two segments of the sequence, you will be queried for assignment of each warfare commander/coordinator in the

TABLE II

Keyboard/Voice Entries for Organizations

KEYBOARD ENTRY	VOICE ENTRY
CCMCARGRU	"Carrier Group"
CCMCRUDESGRU	"Cruiser Destroyer Group"
CCMDESRCN	"Destroyer Squadron"
CCMSUBRCN	"Submarine Squadron"
CC, <ship name>	"Commanding Officer" "<ship name>"

order presented in Table III. As the queries are identical, in each case, only one example (assignment of the Anti-Air Warfare Commander) will be discussed.

TABLE III

CWC Organization Components

OFFICER IN TACTICAL COMMAND (OTC/AB)
ANTI-AIR WARFARE COMMANDER (AAWC)
ANTI-SUBMARINE WARFARE COMMANDER (ASWC)
ANTI-SURFACE WARFARE COMMANDER (ASUWC)
AIR ELEMENT COORDINATOR (AREC)
LAMPS ELEMENT COORDINATOR (LEC)
SUBMARINE ELEMENT COORDINATOR (SEC)
ELECTRONIC WARFARE COORDINATOR (EWC)

(1) Assignment of an Organization. The query shown in Figure 3.65 is representative of those applying to all warfare commanders/coordinators. The specific commander/coordinator will be identified within the query.

??? WHO IS THE ANTI-AIR WARFARE COMMANDER ???

Figure 3.65 Query - Anti-Air Warfare Commander.

The desired response is one of the organizations shown in Table II followed by the appropriate number or ship name, as applicable. For the purposes of our example, we will assign Commander Cruiser Destroyer Group Three (COMCRUDESGRU 3) as AAWC. This is shown in the following example.

KB -- COMCRUDESGRU 3 <cr>
VR -- "Cruiser Destroyer Group" "Three" "Carriage Return"

From the keyboard, or voice, the name of the organization is limited to twenty-five (25) characters. Should an error occur in making this entry, the following warning will be presented.

PLEASE REENTER THE NAME OF THE ORGANIZATION

This would be followed by the warfare commander query to which you are responding. Simply reenter your response. Once the organization has been correctly identified, there are several sequence options which may take place.

If this is the first time you have assigned the specified organization to a warfare commander/coordinator role, you will next be queried for identification of the battle group unit on which the commander/coordinator is embarked. This is covered in the next section.

If the organization has been identified earlier as functioning as another commander/coordinator, and the unit on which it is embarked has been specified, you

will skip the query addressing the embarked unit, and will sequence to the query for the next warfare commander/coordinator. The reason for this is that the system will save you time by assigning the organization on which you are working to the unit you have previously identified as embarking it. In essence, you will skip the embarcation query for any subsequent entry of the same organization.

The final variation in which you can find yourself is initiated by naming a ship's Commanding Officer as a commander/coordinator. It would be redundant to query you about on which ship the Commanding Officer of CALIFORNIA is embarked. If you name a ship's CO as the organization for a queried commander/coordinator, then the system will automatically embark the CO on the appropriate ship. You would not be queried for an embarked unit, and would sequence to the query for identification of the next warfare commander/coordinator.

(2) Identification of the Embarked Unit. Once the organization has been identified, you will next be queried on which unit the commander/coordinator is embarked. This, of course, is subject to the variations mentioned above regarding the type of organization entry you make. The composition of the query for embarked unit is shown in Figure 3.66. We will continue with the development of assigning COMCRUDESGRU 3 as AAWC.

Uniform throughout the system, whenever a requirement for identification of a ship is levied, a listing of the available units is shown. Remember that the system will confirm your entry by atttempting to match it to one of the ships shown in the listing. For our example, we will embark COMCRUDESGRU 3 onboard CALIFORNIA. This entry would be as follows.

KB -- CALIFORNIA <cr>

```
FOR CCMCRUDESGRU 3
          ??? ON WHICH SHIP IS HE EMBARKED ???

     CARL VINSON          PAUL F FOSTER          CALIFORNIA
```

Figure 3.66 Query - Embarked Unit.

VR -- "CALIFORNIA"

Should an error occur in making this entry, the following warning would be presented.

PLEASE ENSURE THAT YOUR ENTRY EXACTLY MATCHES ONE OF THE SHIPS LISTED.

You will again be presented with the query shown in Figure 3.66, and can reenter your response. Once the embarked unit has been correctly identified, you will sequence to the next warfare commander/coordinator, for identification of the organization functioning in that capacity. If all of the commanders/coordinators have been identified, then the entire CWC Organization will be presented for confirmation. This is covered in the next section.

(3) Confirmation of the CWC Organization. The information shown in Figure 3.67 reflects a respresentative CWC organization that you may have entered. It is presented to allow you to make any corrections prior to moving on to the next phase of the BUILD module.

When you continue, by entering "RETURN," you would see the query shown in Figure 3.68, asking if these assignments are correct.

```
HERE IS THE COMPOSITE WARFARE COMMANDER ORGANIZATION
YOU HAVE ENTERED.

   CWC CDR        ORGANIZATION              EMBARKED IN

    OTC           CCMCARGRU 1               CARL VINSON
    AAWC          CCMCRUDESGRU 3            CALIFORNIA
    ASWC          CCMDESRON 23              CARL VINSON
    ASUWC         CC, PAUL F FOSTER         PAUL F FOSTER
    AEW           CC, CARL VINSON           CARL VINSON
    LEC           CC, PAUL F FOSTER         PAUL F FOSTER
    SEC           CCMSUBRON 4               CARL VINSON
    EWC           CCMCRUDESGRU 3            CALIFORNIA

          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.67 Composite Warfare Commander Organization.

```
??? ARE THESE ASSIGNMENTS CORRECT ???
(YES/NO)
```

Figure 3.68 Query -- CWC Organization Correct.

The response to this query is YES/NO as appropriate. If the information is correct, and you enter YES, then you will move on to the next phase of the BUILD module in initialization of the battle group database, helicopter embarcation status. If some of the information shown in Figure 3.67 is incorrect, and you enter NO, then the view shown in Figure 3.69 will be presented.

You identify the entry which is incorrect by specifying the acronym CTC, AAWC, ASWC, etc. Should an error occur in identifying the acronym, the following will be presented.

PLEASE ENTER THE NAME OF THE ACRONYM EXACTLY AS INDICATED

```
??? WHICH WARFARE COMMANDER(S) IS/ARE INCORRECT ???

          OTC    AAWC    ASWC     SEC
          IEC    ASUWC   AREC     EWC

(ENTER THE APPLICABLE ACRONYM)
```

Figure 3.69 CWC Organization Incorrect.

You will then see the query for identification of the warfare commander which is incorrect (Figure 3.69). Once the commander/coordinator has been identified, you will be asked to specify which element, organization, embarked unit, or both, requires correction. This query is shown in Figure 3.70.

```
??? WHICH ENTRY IS INCORRECT:  ORGANIZATION
                               EMBARKED UNIT
                               BOTH

(ENTER THE APPLICABLE PARAMETER)
```

Figure 3.70 Query - Incorrect Element Identification.

If, for example, when we initially identified the organization functioning as AAWC, we had input "CONRUDESGRU 3," and we now wanted to correct it, we would enter the following in response to the query in Figure 3.70.

```
KB --     ORGANIZATION   <cr>
VR --          "Organization"
```

Following this input, you would be presented with the query shown in the figure representative of the commander/coordinator with which you are working. The full CWC organization, as shown in Figure 3.67, will always be shown for confirmation prior to allowing you to move to the next phase of the BUILD module. The full range of options for identification of the incorrect element is shown in the following example.

KB -- ORGANIZATION <cr> or EMBARKED UNIT <cr> or BOTH <cr>

VR -- "Organization" or "Embarked Unit" or "Both"

Should there be a mistake in making this response, then the following will be presented.

PLEASE ENTER "ORGANIZATION," "EMBARKED UNIT," OR "BOTH."

This will be followed by the query shown in Figure 3.70, after which you can reenter your response.

g. Determination of Helicopter Embarcation Status

The next and final phase of initializing the battle group database is determination of the helicopter embarcation status for those ships which are HELO capable. If you had to manually enter the capabilities for a ship not in the master database, then you are familiar with this input sequence, as you specified whether the unit was HELO capable as well as whether the detachment was embarked. For those units whose capabilities were automatically input, you will be initially establishing the EMBARKED/NOT EMBARKED capability. For those ships for which this entry had been made manually, you will be reaffirming the currency of the embarcation status. The composition for the queries is keyed to the type of HELO capability that the ship has.

Aircraft carriers always have their detachments embarked in the master database, therefore, you will not be queried as to their embarcation status. (You will, however, be able to change that embarcation status in the STATUS module, if you so desire.) Using PAUL F FOSTER as an example, the query is shcwn in Figure 3.71.

```
??? DCES PAUL F FOSTER HAVE HER LAMPS DETACHMENT
    ONBOARD ???
```

Figure 3.71 QUERY - HELO Embarcation Status.

The desired respcnse to this query is "YES" or "NO." The format fcr the correct respcnse is as follows.

KB -- YES <cr> or NO <cr>
VR -- "Affirmative" or "Negative"

This query/response sequence will continue for each ship that has a HELO capability. Should there be an error in making this respcnse, then you will be advised to "ENTER YES CR NC," after which ycu can reenter ycur response. Once the helicopter embarcatien status has been determined fcr all HELO capable ships, ycu are finished with initially fcrming the battle group database.

2. Completion of Battle Group Database Initialization

After the helicopter embarcatien status had been determined, you are finished with initializing the battle group database. As was mentioned several paragraphs earlier, the system will now conduct an autcmatic SAVE of the infcrmation

you have entered. Remember, though, that this information will be erased if you terminate your session with a STOP command. When you next invoke the BUILD module from the query shown in Figure 3.6, you will have the capability to INSERT or DELETE a unit, or REBUILD the entire battle group database. The information shown in Figure 3.72 (adjusted) represents the options that are now available to you upon invoking the BUILD module. These capabilities will covered

```
            * BUILD MODULE OPTIONS *

INSERT   --- INSERT A UNIT INTO THE BATTLE GROUP
             DATABASE

DELETE   --- DELETE A UNIT FROM THE BATTLE GROUP
             DATABASE

REBUILD  --- DELETES ALL THE INFORMATION CURRENTLY
             IN USE FOR THE BATTLE GROUP AND ALLOWS
             YOU TO REBUILD THE ENTIRE GROUP.

??? WHAT IS YOUR CHOICE (INSERT, DELETE, REBUILD) ???
```

Figure 3.72 BUILD Module Options.

in the follow-on sections of BUILD module operations.

3. INSERT a Unit Into the Battle Group Database

If you desire to INSERT a unit into the battle group database, your response to the query shown in Figure 3.72 would be as follows.

KB -- INSERT <cr>
VR -- "Insert a Unit"

The first presentation will be a query for the name of the ship you desire to INSERT. This will be indicated by the

appearance of the "SHIP NAME ?" prompt with which you are familiar. Following the prompt, you should enter the name of the ship in question. The restrictions on the format of the name are the same as we have discussed before. If you need more information on name formats, refer to the section in BUILD module operations covering ship name entry. For our example battle group, should we desire to add USS KANSAS CITY (AOE-3), the following input would be appropriate.

KB -- KANSAS CITY <cr>
VR -- "KANSAS CITY"

Should there be an error in making this response, you will be asked to reenter the name of the ship you desire to INSERT. Once the name has been correctly input, the system will reconfirm with you the spelling of your entry. This reconfirmation is shown in Figure 3.73.

```
KANSAS CITY IS THE UNIT YOU DESIRE TO ENTER   (YES/NO)
```

Figure 3.73 Confirmation of INSERTed Ship's Name.

Had we accidentially mispelled KANSAS CITY, then the mispelled name would have appeared in the query. If the name is correctly spelled, and you answered "YES" to the query, the master database will be searched for the ship whose name you have entered. If located, its capability database will be automatically filed. If it is not found in the master database, then manual entry of her capabilities will be required. Manual entry is discussed under Initializing the battle group database. If your response

to the confirmation query had been NO, then the "SHIP NAME ?" prompt would again appear and you could reenter the name of the unit you desire to INSERT.

Once the ship's capabilities have been determined, either automatically or manually, you will next be asked for the ship's position. The format for this query is dependent upon what coordinate system you specified when you initially formed the battle group. The composition of the query will be either that shown in Figure 3.55 or Figure 3.60. If you require more detail in responding to these queries, refer to the section on Polar or Cartesian positions discussed earlier. After determination of the ship's position, you will be asked for her HELO embarcation status, if she is HELO capable. Once the embarcation status has been determined, you will be presented with the new composition of the battle group. This presentation is shown in Figure 3.74.

```
HERE ARE THE UNITS IN YOUR BATTLE GROUP
CARL VINSON      PAUL F FOSTER      CALIFORNIA
KANSAS CITY
     *** PRESS RETURN TO CONTINUE ***
```

Figure 3.74 New Battle Group Composition.

When you continue, you will be advised that if this change to the battle group composition affects the CWC organization, you can make the required correction in the STATUS module. The composition of this warning is shown in Figure 3.75. When you continue, you will be returned to the MAIN module.

```
NOTE -- IF THIS CHANGE AFFECTS THE CWC ORGANIZATION,
YOU CAN CHANGE THE ORGANIZATION IN THE STATUS MODULE.

*** PRESS RETURN TO CONTINUE ***
```

Figure 3.75 Warning - Impact of Change on CWC Organization.

4. DELETE a Unit From the Battle Group Database

If you desired to delete a unit from the battle group database, you would make the following entry in response to the query shown in Figure 3.72.

KB -- DELETE <cr>
VR -- "Delete a Unit"

The first presentation you will see is a listing of the battle group as it now exists. If you now include the insertion of the KANSAS CITY into the battle group, as was done in the INSERT example, the composition of the listing is shown in Figure 3.76.

```
THE BATTLE GROUP CONSISTS OF:
   CARL VINSON        PAUL F FOSTER       CALIFORNIA
   KANSAS CITY

     ??? WHICH UNIT DO YOU DESIRE TO DELETE ???
```

Figure 3.76 DELETE Option - Current Battle Group Listing.

You should enter the name of the unit exactly as shown in the listing. Should a mechanical error (hitting an

incorrect execution key) occur in making this response, you will see the following:

PLEASE ENTER THE NAME OF THE UNIT YOU DESIRE TO DELETE

After this, simply reenter the name of the unit. If you enter the name of a unit not in the battle group database, then the following warning will be displayed.

YOUR ENTRY CANNOT BE LOCATED AMONG THE NAMES OF THE BATTLE GROUP UNITS. PLEASE CHECK THE SPELLING/FORMAT AND REENTER.

*** PRESS RETURN TO CONTINUE ***

When you continue, the query shown in Figure 3.76 will again be presented, and you can reenter your response. If you desired to delete the unit designated as "ZZ," you will be removing the reference position for the graphics portions of the system. If the "ZZ" unit is deleted, you will be advised that the Battle Group position information must be reinitialized. This procedure starts with the query shown in Figure 3.51, which is where you will be cycled.

5. REBUILD the Battle Group Database

If you desire to form a new battle group during a decision support system session, you would enter the following in response to the query shown in Figure 3.72.

KB -- REBUILD <cr>
VR -- "Rebuild Option"

When you select the REBUILD option, you have indicated that you want to erase the current battle group database, and reconstruct a new one. To ensure that you recognize the ramifications of making this selection, the warning shown in Figure 3.77 will be presented.

```
YOU HAVE OPTED TO ERASE THE BATTLE GROUP DATABASE
AND REBUILD IT.

??? ARE YOU SURE THIS IS WHAT YOU WANT TO DO ???

(YES/NO)
```

Figure 3.77 WARNING - Battle Group Database To Be Erased.

The desired response to this query is YES or NO. If you enter "YES," then you will repeat the sequences discussed under Initializing the Battle Group Database. If you enter NO to this query, then you will be returned to the MAIN module, and the current battle group database will be retained. Should an error occur in making this response, you will be asked to reenter your YES/NO response.

H. STATUS MODULE OPERATIONS

The STATUS module basically facilitates data manipulation within the battle group database. In this module you can DISPLAY various capabilities of the battle group, as well as DISPLAY the entire database for a particular unit. It would be in this module, also, that you could CHANGE any element of the unit's database, CHANGE force unit positions, or make a CHANGE to the CWC Organization. Finally, the STATUS module allows you to enter a field of REMARKS about any unit, and have these remarks made a part of that unit's database. The STATUS module is invoked from the query shown in Figure 3.6 as shown below.

```
KB --      STATUS <cr>
VR --   "Status Module"
```

The first time ycu invoke this module, you will be presented with the explanation cf module capabilities shown in Figure 3.78 (adjusted).

```
BATTLE GROUP ASSET MANAGEMENT
DECISICN SUPPORT SYSTEM

* STATUS MODULE *

THIS MODULE WILL AILCW YCU TO PERFORM THREE MAJOR
FUNCTICNS. FIRST, YOU CAN "DISPLAY" UNIT DATABASE,
FCRCE INFORMATION (HELO CAPABILITIES, TASS CAPABILI-
TIES, POSITIONS, MISSIONS, AS WELL AS TOMAHAWK/HARPCCN
CAPABILITIES. SECCND, YCU CAN CHANGE DATA FOR A PAR-
TICULAR UNIT, FORCE POSITIONS, OR AN ELEMENT OF THE
CWC ORGANIZATION. FINALLY, YOU CAN ADD REMARKS (UP TO
25 CHARACTERS) FOR ANY UNIT.

*** PRESS RETURN TC CONTINUE ***
```

Figure 3.78 STATUS Module Capabilities.

This mcdule does not utilize any computer graphics capabilities, therefore, all displays will be made on ycur terminal screen. When you continue, you will be shown the module cptions, and asked if you desire to review the command fcrmat for any option. This view is shown in Figure 3.79.

Each cf these options, with their respective commands, will be discussed in succeeding portions of this sectien cf the manual. If, in respcnse to the query shown in Figure 3.79, you dc nct desire to review the specific command for a capability ycu wish to utilize, you would enter CARRIAGE RETURN, as shcwn in Figure 3.80. This input will generate the query shcwn in Figure 3.81, asking you to input your desired module ccmmand. Shculd an error occur in making this, or

```
                STATUS MCDUIE OPTIONS

        DISPLAY          CHANGE          REMARKS

IF YCU WCULD LIKE IO REVIEW THE FORMATS FOR THE STATUS
MODUIE CCMMANDS, ENTER THE APPROPRITATE OPTION (DIS-
PLAY, CHANGE, REMARKS), OR "EXIT" IF YOU WANT TO IEAVE
THE MCDUIE, OTHERWISE PRESS THE CARRIAGE RETURN TO
CONTINUE.
```

Figure 3.79 STATUS Module Options.

any respcnse to the query shown in Figure 3.79, then the follcwinc warning will be presented.

```
PLEASE ENTER YOUR SEIECTION EXACTLY AS PER THE INSTRUCTIONS

          *** PRESS RETURN TO CONTINUE ***
```

When ycu enter "RETURN," as shown in Figure 3.80, you will again be presented with the view shown in Figure 3.79, and can reenter your respcnse.

```
Make the follcwinc entries, as appropriate, to effect
a "CARRIAGE RETURN" or a "RETURN" command.

                KB  --          <cr>
                VR  --  "Carriage Return"
```

Figure 3.80 Entry of "CARRIAGE RETURN" or "RETURN".

Scme discussion about how the module cperates is in crder at this point. The system will look at your commands

PLEASE ENTER YOUR STATUS MODULE COMMAND

Figure 3.81 STATUS Module Command Query.

and break them up into two or three segments depending on the first word of the command. The key positions for the break up are the spaces between the words of the command. When entering from the keyboard, be sure that if the example shows a space, you enter the space. Otherwise, the system will not recognize your command segments. The examples for entry by voice already allow for the "space" requirement in most cases. When they don't, the examples will show "Space" in the VR command string. Before we discuss the functions of each module option, it would be prudent to review some of the pitfalls you may encounter in entering the required commands.

1. Module Command Format Errors

As we have already discussed, this module looks at all commands in terms of a specific number of segments. The command you will enter will be broken down into segments with the spaces serving as the break points. The system will then look at each segment individually, and in a tree like fashion, evaluate succeeding segments. For example, there are three possible entries which could comprise the first segment, DISPLAY, CHANGE, or REMARKS. Once this segment has been evaluated, the second segment is identified. If the DISPLAY option were selected, and identified as the first command segment, then the system would look for UNIT, FORCE, or COMMAND, as the second segment, as these three entries are the ONLY ones which could legally follow a

DISPLAY option command. This process would continue into evaluation of the third segment, if the particular command entry required one. For your purposes, you need only think of the module option commands as complete phrases in a required format. To avoid any confusion, the next sections will discuss the warnings which will be system generated in response to an inability to recognize a particular segment of a command. These section are here, not to imtimidate you, but rather to give you some reference to the specific cause of an error.

a. Error -- First Command Segment

Once you have entered your module option command, the system will look for the first segment (or word). As you have seen, there are only three possible choices for this segment, as far as the system is concerned, DISPLAY, CHANGE, or REMARKS. If the system cannot match the first segment of your command to one of these words, then the information shown in Figure 3.82 will be presented.

```
YOUR COMMAND CANNOT BE ASSOCIATED WITH "DISPLAY",
"CHANGE", OR "REMARKS".  YOU WILL BE ASKED TO REENTER
THE COMMAND.

        *** PRESS RETURN TO CONTINUE ***
```

Figure 3.82 ERROR - First Segment.

You would continue by entering "CARRIAGE RETURN," as shown in Figure 3.80. Following this entry, you would be returned to the view shown in Figure 3.79, and resume the query/response sequence.

b. Error in Second Segment

The system will anticipate the possible choices for a second segment, based on the identity of the first segment. For the DISPLAY option, there are, again, three possible words which could be second segments, FORCE, UNIT, or COMMAND. If one of these three words cannot be matched to the second segment in your command, the warning shown in Figure 3.83 will be presented.

```
THE ITEM YOU WISHED DISPLAYED IS NOT "UNIT", "FORCE",
OR "COMMAND".  YOU WILL HAVE TO REENTER YOUR COMMAND.

          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.83 ERROR -- DISPLAY Option Second Segment.

You would continue by entering CARRIAGE RETURN, shown in Figure 3.80, and you would be returned to the query shown in Figure 3.79 where you can reinitiate the query/response sequence.

If the first segment of your module option command were CHANGE, the system would look for either FORCE, UNIT, or COMMAND as the second segment. If none of these words could be matched to the second segment of your command, the information shown in Figure 3.84 would be displayed.

You would continue by entering "CARRIAGE RETURN," as shown in Figure 3.80, and you would be returned to the query shown in Figure 3.79, from which you can reinitiate the query/response sequence.

```
THE ELEMENT YOU WISH TO CHANGE IS NOT "FORCE", "COM-
MAND", OR "UNIT".  YOU WILL HAVE TO REENTER THE COM-
MAND.

        *** PRESS RETURN TO CONTINUE ***
```

Figure 3.84 ERROR -- CHANGE Option Second Segment.

If the first segment of your module option command were REMARKS, the system would look for a ship name as the second segment. If there was an error in recognizing your entry as the name of a ship in the battle group, you would be simply asked to reenter the name of the ship in question, and would not be returned to the the query shown in Figure 3.79.

c. Error in Third Command Segment

(1) "DISPLAY FORCE" Command. If you desired to display a capability of the force (DISPLAY FORCE), then the system would look for one of the following words to identify the capability you desire. These words are, MISSIONS, POSITIONS, HELO, HARPOON, TASS, and TOMAHAWK. If none of these words can be matched to the third segment of your command, the information shown in Figure 3.85 will be displayed.

You should make the following entry, in response to the query shown in Figure 3.85, to review the command formats.

KB -- FORMAT <cr>
VR -- "Review Formats"

```
YOUR COMMAND HAS NOT BEEN MATCHED TO THE AVAILABLE OP-
TIONS.  YOU WILL HAVE TO REENTER IT.  SHOULD YOU DE-
SIRE TO REVIEW THE COMMAND FORMAT, ENTER "FORMAT",
OTHERWISE, IF NOT, PRESS CARRIAGE RETURN.
```

Figure 3.85 ERROR -- Command Incorrect.

If you do not desire to review the command formats, then you should enter "CARRIAGE RETURN," as shown in Figure 3.80, and the query shown in Figure 3.81 will be displayed.

(2) "DISPLAY UNIT" Command. If you desired to display the database for a unit (DISPLAY UNIT), the system will anticipate the name of a ship in the battle group as the third segment. It your entry cannot be matched to one of the battle group units, you will be asked to reenter the name of the unit in question.

(3) "DISPLAY COMMAND" Command. There is no third word in the command to display the CWC Organization, therefore, the system does not look for one.

(4) "CHANGE FORCE" Command. The only force element which can be changed is POSITIONS, therefore, the system will look for POSITIONS as the third word in this command. If the third word of your command cannot be matched to POSITIONS, the information displayed in Figure 3.86 will be displayed.

To continue, enter "CARRIAGE RETURN," as shown in Figure 3.80, and you will be returned to the query in Figure 3.79, from which you can reinitiate the query/response sequence.

```
YOU CAN CNLY CHANGE FORCE PCSITIONS.  PLEASE REENTER
YCUR CCMMAND.

          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.86 ERROR -- CHANGE FORCE Option - Third Segment.

(5) "CHANGE UNIT" Command. The third segment in the CHANGE UNIT ccmmand is the name of the unit whcse database you desire tc change. If the system cannot match the name in your command to one of the battle group units, as you have seen befcre, ycu will be asked to reenter the name cf the unit concerned.

(6) "CHANGE COMMAND" Command. There is not third segment to the CHANGE CCMMAND command, therefore, the system will not look for one.

2. STATUS Module -- Display Option

The ccmmands required to initiate the DISPLAY features of this mcdule are shown in Figure 3.87 (adjusted). To have this view presented, you wculd enter the following in respcnse tc the query shown in Figure 3.79.

KB -- DISPLAY <cr>
VR -- "Display" "Carriage Return"

Ycu would enter "RETURN," as shown in Figure 3.80 to continue. When ycu continue, you will be asked to input the mcdule command ycu desire. This query is shown in Figure 3.81. The fact that you have just reviewed the "DISPLAY" ccmmands dces NOT restrict ycu to just "DISPLAY" commands. At this point, you can designate any of the

```
"DISPLAY" COMMANDS:

DISPLAY  UNIT    (UNIT NAME)      DISPLAYS UNIT DATABASE

(ENTER UNIT NAME WITHOUT PARENS
                                  E.G. DISPLAY UNIT MERRILL)

DISPLAY  FORCE   HELO              DISPLAYS HELO CAPABLE
                                   UNITS
                 MISSION           DISPLAYS UNIT MISSIONS
                 POSITIONS         DISPLAYS UNIT POSITIONS
                 HARPOON           DISPLAYS HARPOON
                                   CAPABLE UNITS
                 TOMAHAWK          DISPLAYS TOMAHAWK
                                   CAPABLE UNITS
                 TASS              DISPLAYS TASS CAPABLE
                                   UNITS


DISPLAY  COMMAND                   DISPLAYS CWC ORGANI-
                                   ZATION

          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.87 STATUS Module -- DISPLAY Commands.

module options. We will next look at each of the "DISPLAY" features.

a. Displaying a Unit's Database

This feature of the STATUS module will allow you to view the entire database for the unit you designate. In order to display the unit's database, you would enter the following in response to the query shown in Figure 3.81.

KB -- DISPLAY UNIT PAUL F FOSTER <cr> or
DISPLAY UNIT CARL VINSON <cr>

VR -- "Display" "Unit" "PAUL F FOSTER" or
"Display" "Unit" "CARL VINSON"

The same requirements for ship names apply here as you have seen earlier. You could use the shorter name forms (e.g. FOSTER for PAUL F FOSTER or VINSON for CARL VINSON) in either input case. The system will segment the command in the following order, "DISPLAY," "UNIT," "<ship name>." As you have already seen, the DSS will attempt to match the name of the unit you have entered with those in the battle group database. If there is no match made, you will be asked to reenter the name of the ship ONLY, not the entire command. The format for the database display is shown in Table IV. In the display for an actual ship, the headings shown in Table IV, as well as the ship's capabilities would be shown together. PAUL F FOSTER is utilized as an example. Some comments about the rationale for the format of this display are appropriate. In order to accomodate the amount of data in the ship's database, and still display it on one view, the resultant format is somewhat congested. Incorporating the information this way, however, affords the user the advantage of having everything readily displayed, as opposed to sequencing through different views. The data is organized into categories as a method of partitioning the information shown. It is the opinion of the author that once familiar with the information format, the user will feel comfortable with the display.

TABLE IV

Ship's Database Display Format

```
DATABASE FOR   PAUL F FOSTER                    HULL NUMBER - DD964
GROUP COMMANDER -  1                        DESTROYER SQUADRON -  23
PRIMARY MISSION AREA - ASW                SECONDARY MISSION AREA -  ASU
POSITION -  W  90 50                        MAXIMUM SPEED -  33  KNOTS

* SENSORS *

AIR SRCH(PRI)- AN/SPS-40    AIR SRCH(SEC)- NONE    SURF SRCH- AN/SPS-55
FIRE CONTROL (PRI) - MK-91                  FIRE CONTROL (SEC) -  AN/SPG-60
SONAR - AN/SQS-53          IVDS -  NONE                  TASS - AN/SQR-19
SLQ-32 CAPABILITY - YES

* COMMAND AND CONTROL *

UHF RADIOS-   6 ONBD  6  AVAIL   HF RADIOS-   4 ONBD   4   AVAIL
SATCOM CAPABILITY -  AN/WSC-3

* WEAPONS SYSTEMS *

MISSILE (PRI) - NSSMS (RIM-7)                  MISSILE (SEC)-    NONE
GUN SYSTEM - 5"/54 (127 mm) MK45     ASW ROCKET - ASROC     TORPEDO -MK46
PHALANX SYSTEMS - 2  TOMAHAWK CAPABILITY - YES   HARPOON CAPABILITY -YES

* MISC *

HELICOPTER CAPABILITY - LAMPS                  STATUS - EMBARKED
REMARKS:  CCMDESRON 23 EMBARKED

              *** PRESS RETURN TO CONTINUE ***
```

There are two caveats regarding the display of a unit database. First, if the ship to be displayed is an aircraft carrier, the GROUP COMMANDER entry will be replaced with CARRIER GROUP. Second, the format of the position information is keyed to the type of coordinate system chosen (polar or cartesian). Finally, unless you enter them, there are no stored REMARKS for a ship. Therefore, the field following that heading may be blank. When you enter "CARRIAGE RETURN," following this display, you will be returned to the query shown in Figure 3.79.

b. Display Force Helicopter Capabilities

This feature of the STATUS module will allow you to observe the helicopter capable units in the battle group and determine their detachment EMBARK/NOT EMBARKED status. You invoke this capability by entering the following in response to the query shown in Figure 3.81.

KB -- DISPLAY FORCE HELO <cr>
VR -- "Display" "Battle Group" "Helicopter Units"

This command would generate a display on the terminal screen, of the battle group units, their helicopter capability, and the embarcation status of the detachment, if applicable. Obviously, if the ship has no capability, the status would be NOT EMBARKED. The format for this presentation, with some representative data, is shown in Figure 3.88.

Within the composition of Figure 3.88, you will notice the capability/status entry "NO STATUS." This means that there is no database entry for these capabilities. The normal manner in which this could occur would have come from manual database entry in the BUILD module. When you are inputting the ship's capability database manually, you can skip some of the required information from the

```
        * BATTLE GROUP HELO CAPABLE UNITS *

   UNIT NAME          CAPABILITY              EMBARKED

PAUL F FOSTER      LAMPS DETACHMENT        EMBARKED
CALIFORNIA         NOT CAPABLE             NOT EMBARKED
CARL VINSON        SH-3 DETACHMENT         EMBARKED
KANSAS CITY        CH-46 DETACHMENT        EMBARKED
GUAM               NO STATUS               NO STATUS

          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.88 STATUS Module -- Display of Helo Capable Units.

capability menus. The appearance of "NO STATUS" indicates that this has, in fact, happened. To correct this situation, you would utilize the CHANGE capability of the STATUS module to input the appropriate capability, a topic which is forthcoming. When you are through with reviewing the helicopter capability information and continue, you will be returned to the presentation shown in Figure 3.79.

c. Display of Force Positions

This feature of the STATUS module allows you to display, on the terminal screen, the positions of the ships in the battle group. You would invoke this capability by entering the following in response to the query shown in Figure 3.81.

```
KB --      DISPLAY FORCE POSITIONS     <cr>
VR --  "Display" "Battle Group" "Positions"
```

The specific display which would result from this command depends on the type of coordinate system in use. If the polar coordinate system is currently being utilized, then the Figure 3.89 shows a representative display of the

information you will observe. If the cartesian coordinate system is being utilized, then the presentation shown in Figure 3.90 is representative of the information you will observe.

```
                    BATTLE GROUP POSITIONS
                          (POLAR)

   ID            NAME                BNG            RNG

    1       PAUL F FOSTER            90           50000
    2       CARL VINSON               0               0
    3       CALIFORNIA                0          100000

            *** PRESS RETURN TO CONTINUE***
```

Figure 3.89 Battle Group Positions -- Polar.

Let's examine the information in the presentation shown in Figure 3.89. You should first notice that any leading zeros are omitted. Therefore, "090" would be displayed "90," and "000" would be displayed "0." Such is the case with the positions of FOSTER and CARL VINSON, respectively. The positions shown in the presentation for the polar coordinate system show bearings and ranges from "ZZ." You can see, then, from the information in Figure 3.89, that CARL VINSON is at "ZZ," as her bearing and range are both ZERO (0). From this display, you can determine the following: PAUL F FOSTER is bearing 090 degrees true, range 50,000 yards from "ZZ," CARL VINSON is at "ZZ," and CALIFORNIA is bearing 000 degrees true, range 100,000 yards from "ZZ." In all cases, you could substitute CARL VINSON for any "ZZ" designation. The cartesian positions are displayed as shown next.

BATTLE GROUP POSITIONS
(CARTESIAN)

ID	UNIT	QUAD	X-POSIT	Y-POSIT
1	PAUL F FOSTER	W	100	90
2	CARL VINSON	G	20	10
3	CALIFORNIA	B	100	50

*** PRESS RETURN TO CONTINUE ***

Figure 3.90 Battle Group Positions -- Cartesian.

As we saw in the example of polar positions, there are NO leading zeros shown in the numbers. You could derive the following from the information shown in Figure 3.90. PAUL F FOSTER is in the WHITE quadrant, with x-position 100 and y-position 90. CARL VINSON is in the GREEN quadrant, with x-position 20 and y-position 10. CALIFORNIA is in the BLUE quadrant, with x-position 100 and y-position 50. Unlike the example for polar positions, it is not clear from the information shown in Figure 3.90, which unit is at "ZZ." If you were using the cartesian coordinate system, and desired to determine which unit is at "ZZ," you should move to the SENSOR module and display the battle group positions on the graphics monitor. This would give you a better feel for the "relative" positioning of the units.

To continue, after viewing the battle group positions, you would enter the command shown in Figure 3.80. So doing will return you to the query shown in Figure 3.79.

d. Display of Force Missions

This feature of the STATUS module allows you to view the current primary and secondary missions of the

battle group units. Aside from the informational value of this display, you can get the feel for a key element of the communications makeup of the battle group. The primary and secondary missions for each unit serve as the keys to assigning those units to the various battle group communications nets. Therefore, as a unit has a primary mission of AAW, and a secondary mission of ASW, she would be included in all AAW and ASW circuits, as well as circuits designated for the Force as a whole. To display the battle group missions, make the following entry in response to the query shown in Figure 3.79.

```
KE --            DISPLAY FORCE MISSIONS        <cr>
VR --   "Display" "Battle Group" "Mission Areas"
```

Figure 3.91 (adjusted) shows the composition of the battle group Missions display. It is essentially in two groups of columns showing the ship names, primary and secondary missions in each of the two columns.

```
        * BATTLE GROUP MISSIONS *
     NAME              PRI          SEC

PAUL F FOSTER          ASW          ASU
CARL VINSON            STR          AAW
CALIFORNIA             AAW          ASU

     *** PRESS RETURN TO CONTINUE ***
```

Figure 3.91 Battle Group Missions.

The representation shown in this figure is straightfoward. Table V shows the definitions of the various mission area abbreviations.

TABLE V

Mission Areas

Abbreviation	Mission Area
NNN	No Mission
AAW	Anti-Air Warfare
ASW	Anti-submaring Warfare
ASU	Anti-Surface Warfare
AMW	Amphibious Warfare (NGFS)
STR	Strike Warfare
LOG	Logistic Support

You can return to the module menu (Figure 3.79), after viewing the mission informaticns in the display of Figure 3.91, by entering "RETURN," as shown in Figure 3.80.

e. Display cf Force HARPOON Capable Units

This feature of the STATUS module allows ycu to display the names of the units in the battle group which have a HARPCON capability. To initiate this feature, you would enter the follcwing command in response to the query shown in Figure 3.79.

KB -- DISPLAY FORCE HARPOON <cr>

VR -- "Display" "Battle Group" "HARPOON Weapons"

This ccmmand would result in the display shown in Figure 3.92. The composition of this display is straightfcward in that cnly the names cf the HARPOON capable units are shcwn.

If there were no HARPCON capable units in the battle group, ycu wculd see the following on the terminal screen.

********** NONE FOUND **********

```
* BATTLE GROUP HARPOON CAPABLE UNITS*

    <ship name>
    <ship name>
    <ship name>

  *** PRESS RETURN TO CONTINUE ***
```

Figure 3.92 Harpoon Capable Units.

Following this display, you can continue, and return to the module menu, by entering CARRIAGE RETURN, as shown in Figure 3.80.

f. Display of Force TOMAHAWK Capable Units

Similar to the previous section, this feature of the STATUS module allows you to display the names of the units in the battle group which have a TOMAHAWK weapons capability. To display this information, you would make the following response to the query shown in Figure 3.79.

KE -- DISPLAY FORCE TOMAHAWK <cr>
VB -- "Display" "Battle Group" "TOMAHAWK Weapons"

The display you would initiate in making this response is shown in Figure 3.93. As you saw with the HARPOON capability display, only the names of the ships with this capability are shown.

If there had been no units in the battle group with this capability, then the following would be displayed.

********** NONE FOUND **********

When you are finished with this information, you can return to the module menu by entering "RETURN," as described in Figure 3.80.

```
* BATTLE GROUP TOMAHAWK CAPABLE UNITS *

   <ship name>
   <ship name>
   <ship name>

   *** PRESS RETURN TO CONTINUE ***
```

Figure 3.93 TOMAHAWK Capable Units.

g. Display of Force TASS Capable Units

This capability of the STATUS module allows you to display the names of the units in the battle group with a TASS capability, along with the name of the specific model of the equipment onboard. To initiate this feature, you would enter the following in response to the query shown in Figure 3.79.

KE -- DISPLAY FORCE TASS <cr>
VR -- "Display" "Battle Group" "TASS Systems"

The information shown in Figure 3.94 is representative of the display you would observe after making this entry.

```
* BATTLE GROUP TASS CAPABLE UNITS *

PAUL F FOSTER        AN/SQR-19 (IMPROVED TACTASS)
ALBERT DAVID         AN/SQR-18 (TACTASS)

*** PRESS RETURN TO CONTINUE ***
```

Figure 3.94 TASS Capable Units.

If no units with a TASS capability were found to be in the battle group, the following would be displayed on the terminal screen.

********** NONE FOUND **********

When you are through reviewing the information shown in Figure 3.94, you can return to the module menu by entering "CARRIAGE RETURN," as shown in Figure 3.80.

h. Display Composite Warfare Commander Organization

This feature ofthe STATUS module allows you to display the current CWC organization. This display is initiated by making the following entry in response to the query shown in Figure 3.79.

KB -- DISPLAY COMMAND <cr>
VR -- "Display " "CWC Organization"

As a result of making this entry, you would see the information shown in Figure 3.95, which is representative of a normal CWC organization.

When you are through with this information, and are ready to return to the module menu, you should enter CARRIAGE RETURN, as shown in Figure 3.80.

3. STATUS Module -- Change Option

The formats for the CHANGE commands are shown in Figure 3.96. These commands can be displayed by entering the following in response to the query shown in Figure 3.79.

KB -- CHANGE <cr>
VR -- "Change Database" "Carriage Return"

```
HERE IS A LIST OF THE COMPOSITE WARFARE COMMANDER ORGANIZATION YOU HAVE ENTERED.

    CWC CDR              ORGANIZATION          EMBARKED IN

     OTC                 COMCRUDESGRU 3        NIMITZ
     AAWC                CO, GRIDLEY           GRIDLEY
     ASWC                COMDESRON 23          MERRILL
     ASUWC               CO, MERRILL           MERRILL
     AREC                CO, NIMITZ            NIMITZ
     LEC                 CO, PAUL F FOSTER     PAUL F FOSTER
     SEC                 COMSUBRON 4           NIMITZ
     EWC                 CO, GRIDLEY           GRIDLEY

          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.95 Composite Warfare Commander Organization.

```
"CHANGE" COMMANDS:

CHANGE (UNIT NAME)              CHANGE DATABASE FOR A UNIT

    (ENTER UNIT NAME WITHOUT PARENS E.G. CHANGE NIMITZ.
     A MENU WILL BE PROVIDED FOR SELECTION OF SPECIFIC
     ELEMENT)

CHANGE FORCE POSITIONS          CHANGES POSITIONS FOR ALL
                                UNITS

CHANGE COMMAND                  CHANGE CWC ORGANIZATION

          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.96 STATUS Module -- CHANGE Commands.

When ready, you would continue by entering CARRIAGE RETURN, as shown in Figure 3.60. You will then be presented with

the query for your STATUS module command, as shown in Figure 3.81. Even though you have just reviewed the CHANGE command formats, you are not limited to making a CHANGE command, and are free to utilize either DISPLAY, CHANGE, or REMARKS. We will look at each of the CHANGE command options individually.

a. Changing a Unit's Database

If you desire to change a unit's database, you should make the following entry in response to the query shown in Figure 3.81. As an example, we have decided to CHANGE the FOSTER'S database.

KE -- CHANGE UNIT PAUL F FOSTER <cr>
VR -- "Change Database" "Unit" "PAUL F FOSTER"

In order to identify the specific capability in the FOSTER'S database you desire to change, you will be presented with a menu listing the titles of the capabilities in the database. This menu is shown in Figure 3.97.

As a point of interest, the capabilities listed in Figure 3.97 show the elements of the master database that are stored for each unit, with the exception of the available UHF/HF radios, addressed in the COMMS module. If the unit was not in the master database, these items were the capabilities which you input manually for that unit. The operations involved with changing a unit's database will utilize the same menus which you utilized in performing this manual entry. They are all shown in the section under the BUILD MODULE OPERATIONS heading, which covers manual entry of the database. Here is how it will work.

The desired response to the menu shown in Figure 3.97 would be the number corresponding to the capability which you desire to change in the unit's database. There are generally two categories of option. First, you can

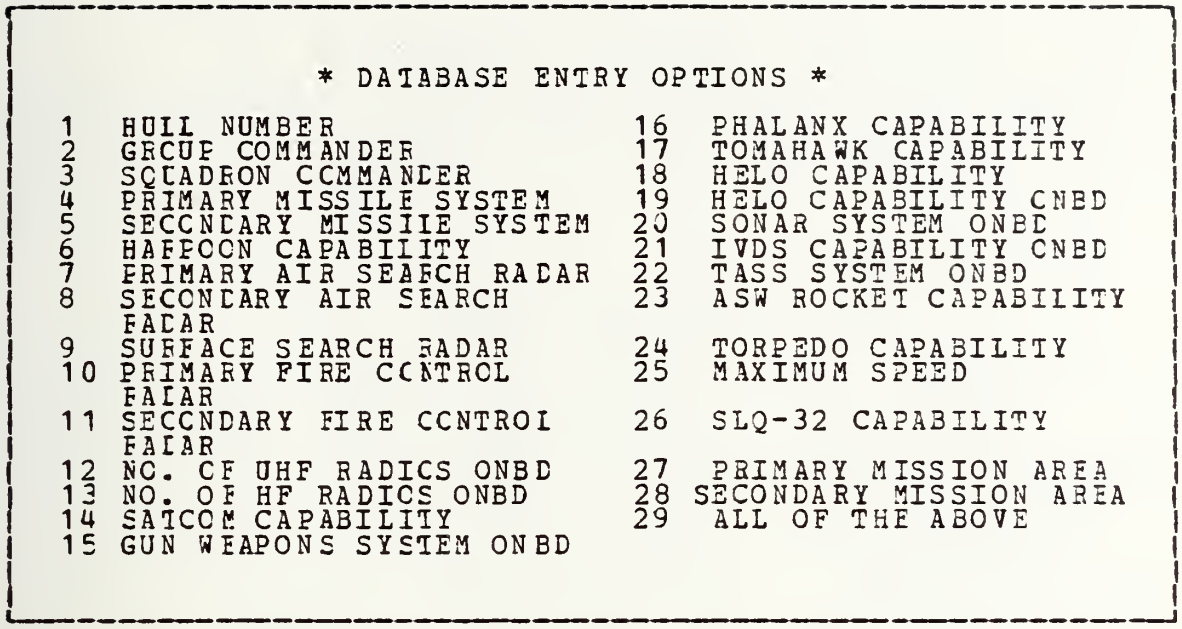

Figure 3.97 Unit Database Capability Options.

specify the specific capability you desire to change (numbers 1 - 28), CR, you can change, or more exactly, rewrite, the unit's entire database. In the former category, you would be queried for the capability you specify, with the option menu corresponding to that capability, and then returned to the STATUS module. In the latter case, you would be recompiling the unit's database, and would therefore, sequence through ALL of the capability menus, and then returned to the STATUS module. After you have completed with the option you select, you will be queried as to whether you desire to make this/these changes a permanent part of the master database. The intent of this feature is to allow you to maintain a real time database, reflective of the unit's capabilities, NOW. More often than not, these changes would be of a temporary nature. Should however, the change(s) you make be of a permanent nature, then you could premanently change the master database. It is your choice.

If you desired to change the PRIMARY MISSILE SYSTEM capability of the unit you designated in response to the query shown in Figure 3.81, you would make the following entry from the menu.

KB -- 4 <cr>
VR -- "Four" "Carriage Return"

Entering this command woud result in the display of the MISSILE SYSTEM OPTIONS menu shown in Figure 3.25. You would designate the system the unit now has by indicating the appropriate system from the menu. (This is covered, in detail, under BUILD MODULE OPERATIONS.) Table VI can serve as a quick reference to the menus which will appear when you designate a particular capability change.

Once you have made your change, the query shown in Figure 3.98 will be presented, as has already been discussed. If you enter YES to this query, the change you have just made will become a part of the master database. If you enter NO to this query, the change will be retained in the battle group database ONLY.

```
??? WOULD YOU LIKE TO MAKE THIS CHANGE TO BE PERMA-
NENTLY MADE TO THE MASTER DATABASE ???
(YES/NO)
```

Figure 3.98 Query -- Make a Capability Change Permanent.

As a review, the format for this response is shown in the following example.

KB -- YES <cr> or NO <cr>
VR -- "Affirmative" or "Negative"

TABLE VI

Reference of Database Capabilities vs. Option Menus

	Capability	Option Menu
1 --	HULL NUMBER	Figure 3.19
2 --	GROUP COMMANDER	Figure 3.23
3 --	SQUADRON COMMANDER	Figure 3.24
4 --	PRIMARY MISSILE SYSTEM	Figure 3.25
5 --	SECONDARY MISSILE SYSTEM	Figure 3.25
6 --	HARPOON CAPABILITY	Figure 3.26
7 --	PRIMARY AIR SEARCH RADAR	Figure 3.27
8 --	SECONDARY AIR SEARCH RADAR	Figure 3.27
9 --	SURFACE SEARCH RADAR	Figure 3.29
10 --	PRIMARY FIRE CONTROL RADAR	Figure 3.30
11 --	SECONDARY FIRE CONTROL RADAR	Figure 3.30
12 --	NO. OF UHF RADIOS ONBOARD	Figure 3.31
13 --	NO. OF HF RADIOS ONBOARD	Figure 3.32
14 --	SATCOM CAPABILITY	Figure 3.34
15 --	GUN WEAPONS SYSTEM CAPABILITY	Figure 3.35
16 --	PHALANX CAPABILITY	Figure 3.36
17 --	TOMAHAWK CAPABILITY	Figure 3.37
18 --	HELO CAPABILITY	Figure 3.38
19 --	HELO CAPABILITY ONBOARD	Based on HELO Type
20 --	SONAR SYSTEM ONBOARD	Figure 3.41
21 --	IVDS SYSTEM ONBOARD	Figure 3.42
22 --	TASS SYSTEM ONBOARD	Figure 3.43
23 --	ASW ROCKET CAPABILITY	Figure 3.44
24 --	TORPEDO CAPABILITY	Figure 3.45
25 --	MAXIMUM SPEED	Figure 3.46
26 --	SLQ-32 CAPABILITY	Figure 3.47
27 --	PRIMARY MISSION AREA	Figure 3.49
28 --	SECONDARY MISSION AREA	Figure 3.49
29 --	ALL OF THE ABOVE	All Menus

b. Changing Force Positions

The only "Force" elements you can change are the positions of the units. If you desire to change the positions of the units in the force, you would make the following entry in response to the query shown in Figure 3.81.

KE -- CHANGE FORCE POSITIONS <cr>

VR -- "Change Database" "Battle Group" "Positions"

The first view that will be presented in response to this entry is either that shown in Figure 3.89 (if POLAR coordinate system is in use), or Figure 3.90 (if CARTESIAN coordinate system is in use). This view will display the positions of the units in the battle group as they currently exist in the battle group database. You will next be queried regarding what position information you desire to CHANGE. This is shown in Figure 3.99.

```
IF YOU WOULD LIKE TO REVAMP ZZ, COORDINATE SYSTEM, AND
UNIT'S POSITIONS, ENTER "0", OTHERWISE, TO CHANGE A
PARTICULAR UNIT'S POSITION, ENTER THE ID NUMBER CO-
RRESPONDING TO THE UNIT.
```

Figure 3.99 Query -- Change to Battle Group Positions.

The desired response to this query is similar to others you have made requiring the entry of a number from a menu. If you enter ZERO (0) to this query, you will repeat the query sequence which was used in the BUILD module to initially establish the battle group positions. The first view you will see is that shown in Figure 3.51, asking for the identity of the unit at "ZZ." This will be followed by queries for identification of coordinate system, and positions of each unit in the battle group. (These sequences are covered in detail in the section on BUILD MODULE OPERATIONS.)

If you desire to change only the position of a particular unit, you would enter the number corresponding to that unit, from the query shown in Figure 3.89, or Figure 3.90. You would then begin the query sequence for either

polar or cartesian position determination, as appropriate, with the views shown in Figure 3.55, or Figure 3.60, respectively. Once completed, irrespective of the option chosen (all or individual unit), you will be returned to the STATUS module menu (Figure 3.79).

c. Changing the CWC Organization

If you desire to change all or part of the CWC organizational structure, you would make the following response to the query shown in Figure 3.81.

KB -- CHANGE COMMAND <cr>
VR -- "Change Database" "CWC Organization"

On making this response, you will be presented with a display of the current CWC Organization, an example of which is shown in Figure 3.67. When you continue by entering CARRIAGE RETURN, as shown in Figure 3.80, you will be asked if those assignments are correct. This query is shown in Figure 3.68. Based on your response to this query (YES/NO), you will follow the query sequences previously discussed in the BUILD module, for making corrections to the CWC Organization. If you need to review these sequences, you should refer to the "List of Figures" for the title of the view/query composition you desire. When you have completed making changes to the CWC Organization, you will be returned to the STATUS module menu (Figure 3.79).

4. STATUS Module -- REMARKS Option

This feature of the STATUS module allows you to enter descriptive remarks to be included, and displayed, with a particular unit's database. The format for the REMARKS command is shown in Figure 3.100. The display of the command format is obtained by making the following entry in response to the query shown in Figure 3.79.

KB -- REMARKS <cr>

VR -- "REMARKS" "Carriage Return"

"REMARKS" COMMANDS:

REMARKS (UNIT NAME) ENTER REMARKS FOR A UNIT

(ENTER THE NAME WITHOUT PARENS, E.G. REMARKS JOHN YOUNG)

Figure 3.100 Status Module -- REMARKS Command.

The format of the command is straightfoward, "REMARKS" is always followed by the name of a ship in the battle group. When you continue, by entering CARRIAGE RETURN, as shown in Figure 3.80, you will be presented with the query shown in Figure 3.101. As an example, if you wanted to enter remarks for CARL VINSON, the following would be your response to the query shown in Figure 3.81.

KB -- REMARKS CARL VINSON <cr> or
REMARKS VINSON <cr>

VR -- "Remarks" "CARL VINSON" or
"Remarks" "VINSON"

Your entry would be followed with the query for the remarks, which is shown in Figure 3.101.

REMARKS can ONLY be entered from the KEYBOARD. The language flexibility for voice input restricts input of other than system commands. The form of your REMARKS can

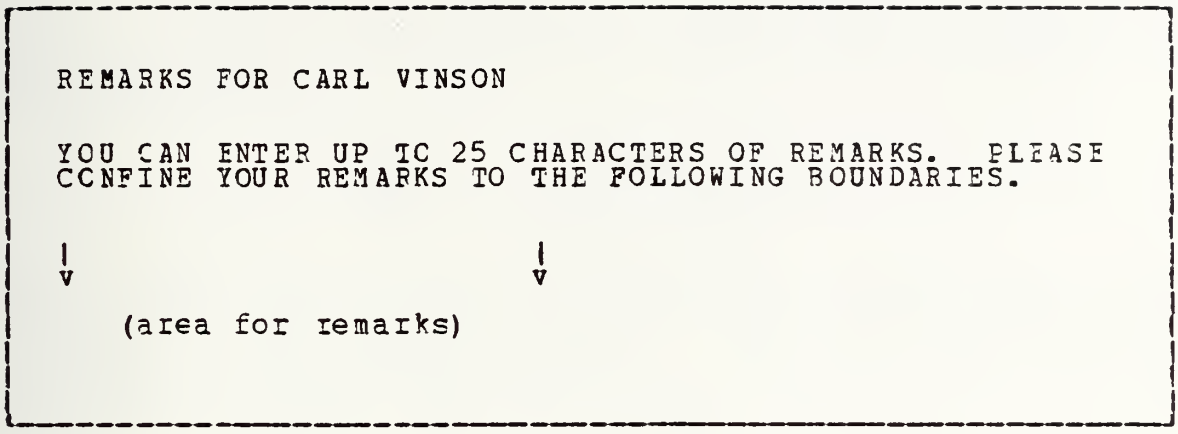

Figure 3.101 REMARKS Input.

take on anything you desire (e.g. Embarked Commander, Capability Impairment, Schedule, etc.), provided the field of the statement is within the boundaries shown in the query. Should you exceed the confines of the boundaries, the information to the right of the right guide arrow will not be read into the system. Once you have entered the remarks, they will become a permanent part of that unit's database, and will be included in the database display invoked with the "DISPLAY UNIT" command. Once the remarks have been entered, you will be returned to the module menu (Figure 3.79).

I. COMMS MODULE OPERATIONS

This feature of the DSS basically allows you to do two things. First, you can maintain the numbers of "Available" UHF/HF radios onboard each battle group unit. The second function of this module is to allow you the opportunity to display the composition of a battle group communications net. The display of the communications net requires that you have a graphics capability. If you do not have one, you must restrict your use of this module to managing the

numbers of available radios. You would invoke the COMMS module, from the query shown in Figure 3.6, by making the following entry.

KB -- COMMS <cr>
VR -- "Comms Module"

This command will cause the COMMS module master menu to be presented on the terminal screen. The format of this menu is shown in Figure 3.102.

```
        * BATTLE GROUP ASSET MANAGEMENT *
          * DECISION SUPPORT SYSTEM *

              * COMMS MODULE *

   IN THIS MODULE, YOU HAVE THE FOLLOWING GENERAL
   OPTIONS:

 1 -- CHANGE THE NUMBER OF AVAILABLE RADIOS ONBOARD A
      UNIT
 2 -- DISPLAY THE PARTICIPANTS IN A BATTLE GROUP RADIO
      NET
 3 -- RETURN TO THE MAIN MODULE

 (SELECT ONE OF THE ABOVE (1, 2, OR 3))
```

Figure 3.102 COMMS Module Options Menu.

The correct response to this query is the number corresponding to the option you desire. If you desired to display the participants of a radio net, the following is an example of a correct entry.

KB -- 2 <cr>
VR -- "Two" "Carriage Return"

If an error were to occur in making this response, you would be simply directed to reenter your response (1, 2, or 3). We will next look at each of the available module options.

1. COMMS Module -- Change the Number of Available Radios

The aim of this feature of the COMMS module is to allow you to maintain a real time estimate of the numbers of available UHF/HF radios onboard the units in the battle group. The intent is then to compare these numbers with the numbers of installed radios on the ships. The query sequences associated with the determination of either UHF or HF available radios will be discussed individually. In response to the query shown in Figure 3.102, you would make the following entry to invoke this module feature.

KB -- 1 <cr>
VR -- "One" "Carriage Return"

The next query that will be presented will be to identify the unit to which this change will apply. The format for this query, with a representative composition of ships, is shown in Figure 3.103.

```
? FOR WHICH BATTLE GROUP UNIT WILL THIS CHANGE APPLY ?

CARL VINSON          PAUL F FOSTER          CALIFORNIA
```

Figure 3.103 Query -- Unit Whose Radios are to be Changed.

The entry of the name of the unit must match the name of one of those ships in the list following the query. The system will check your entry against the list, and if

there is no match, you will be asked to reenter the name of the applicable unit. The next query will address whether you desire to ADD or DELETE either a UHF or HF radio. The format for this query is shown in Figure 3.104, and for example, suppose you wanted to change the number of radios on CALIFORNIA.

```
FOR CALIFORNIA
 WHICH OF THE FOLLOWING OPTIONS WOULD YOU LIKE TO USE

          1 -- ADD AN AVAILABLE UHF RADIO
          2 -- DELETE AN AVAILABLE UHF RADIO
          3 -- ADD AN AVAILABLE HF RADIO
          4 -- DELETE AN AVAILABLE HF RADIO

(ENTER 1, 2, 3, OR 4)
```

Figure 3.104 Query -- ADD or DELETE a UHF/HF Radio.

The desired response to this query is straightfoward. These options will allow the change of only one (1) radio at a time. Additionally, the system will check the change you are making to ensure two things. First, you cannot increase the number of available radios beyond the database number of installed radios of any type. Second, you cannot decrease the numbers of available radios below zero (0). The controlling limits are determined by the numbers of UHF and HF radios in the database. If those numbers are incorrect, or there has been a change to them, you can input that change in the STATUS module. If need be, refer to the appropriate topic in that module to effect a change, if required. You can also view the number of installed radios

cnboard a unit by displaying its database. This is dcne in the STATUS module as well. Each time you attempt to change the number cf radios cnboard a unit, you will see a summary of the current database regarding the installed and available UHF and HF, after each entry.

If there is a checking problem with the onboard numbers, cne of the warnings shown in Figure 3.105 will be presented, as appropriate.

```
CALIFCRNIA ALREADY HAS ALL HER UHF/HF RADIOS AVAILABLE

(If the number of available radios equals the number
of installed radics, and you attempt to add a radio)

  CALIFCRNIA HAS NC UHF/HF RADIOS AVAILABLE ALREADY

(If the number of available radios is already zero
(0), and you attempt to delete a radio.)
```

Figure 3.105 Warning -- Radio Numbers Mismatch.

Once the transaction (adding or deleting a radio) has been completed, you will be returned to the module master menu (Figure 3.102).

2. Display of a Communications Net

If, in respcnse to the query shown in Figure 3.102, you desired to display the composition of a communications net, ycu would enter two (2). As this display will be on the graphics monitor, you will be first asked which monitor you desire to use. The format for this query is shown in Figure 3.108, and the desired response is the number

corresponding to the monitor you want to use. You would next be presented with a listing of the battle group communications plan. This plan contains the names of twenty (20) circuits, along with the frequency range of the circuit, and the name of the Net Control Station (NECOS). The format for this menu is shown in Figure 3.106.

```
        * BATTLE GROUP COMMUNICATIONS CIRCUITS *

CKT ID          NET NAME                FREQ        NECOS

  1       TF/TG COMMAND                  HF          OTC
  2       TF/TG ORESTES                  HF          OTC
  3       TF/TG ORESTES                  UHF         OTC
  4       AAW CMD & RPT PRIMARY          HF          AAWC
  5       AAW CMD & RPT SECONDARY        HF          AAWC
  6       AAW CMD & RPT                  UHF         AAWC
  7       EW REPORTING                   HF          EWC
  8       EW REPORTING                   UHF         EWC
  9       SSSC                           HF          ASUWC
 10       SAC NET ALFA                   UHF         ASUWC
 11       SAC NET BRAVO                  UHF         ASWC
 12       VP COORDINATION                UHF         ASWC
 13       LINK 11                        HF          AAWC
 14       LINK 11                        UHF         AAWC
 15       LINK 14                        HF          AAWC
 16       LINK 14                        UHF         AAWC
 17       PRITAC                         UHF         OTC
 18       PRI CI                         UHF (S)     OTC
 19       DATA LINK COORDINATION         HF          AAWC
 20       DATA LINK COORDINATION         UHF         AAWC


(SELECT THE APPROPRIATE CIRCUIT ID NUMBER (CKT ID))
```

Figure 3.106 Battle Group Communications Circuits.

The result of this entry will be a fan shaped display on the graphics monitor. Within this fan, will be the net control station, and the unit on which it is embarked, at the hub. There will then be lines projecting outwards, at the end of which will be the names of the units who are participants on that net. Finally the name of the

circuit being displayed will be shown across the bottom of the monitor screen.

The display will be color keyed to highlight several considerations about the circuit. As was mentioned earlier, the mission area assigned to a unit determines its participation on a force radio circuit. Those units whose primary mission requires them to be on the net will be connected to the hub with "green" lines. Those units whose secondary missions require them to be on the net are connected to the hub with "cyan" lines. The overall color of the hub and the circuit name indicate the frequency of the circuit. If the color is "yellow," the circuit is a UHF net. If the color is "red," the circuit is an HF net. The final information which is color keyed, applies to UHF nets. It is conceivable that a unit may be required on a particular UHF net, however, due to range from the NECCS, participation MAY be impaired. To accent this possibility, on UHF nets, a participating unit whose range is greater than 35 nautical miles from the NECOS will have its name shown in "red." The normal color for the ships' names is "yellow," indicating that the unit is within communications range of the NECOS. This "legend" information will be displayed on the terminal screen each time you display a circuit. The format for this legend is shown in Figure 3.107. When you have completed with the circuit graphics display,

KB -- <cr>
VR -- "Carriage Return"

you would make the following entry, and will be cycled back to the module menu (Figure 3.102).

```
                    * GRAPHICS LEGEND *

DISPLAY              COLOR          DESRCRIPTION

SHIP NAMES           RED        OUT OF COMM RNG OF NECOS
                     YELLOW     WITHIN COMM RNG OF NECOS

CONNECTING
      LINES          GREEN      PRIMARY MISSION REQMT
                     CYAN       SECONDARY MISSION REQMT

NECOS LABEL/
    CIRCUIT NAME     YELLOW     UHF CIRCUIT
                     RED        HF CIRCUIT

          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.107 Communications Display Legend.

J. SENSCR MODULE OPERATIONS

The SENSOR module utilizes computer graphics in allowing you to display the coverage areas of the various senscrs of each unit in the battle group. As this module does use graphics, if you do not have a graphics capability where you are working, you will be unable to operate within this module. In addition to the sensor coverage displays, you can display the cartesian coordinate axes, the threat sector, as well as experiment with changing the position of a unit and observing the effects on coverage area effectiveness. You invoke the SENSOR module by making the following response to the query shown in Figure 3.6.

KB -- SENSOR <cr>
VR -- "Senscr Module"

Unique to the operations of the computer system in the WARLAB at NPS, you would next be queried as to your desires

regarding the graphics terminal to be used. This query is in reference to the terminal number. The composition of this query is shown in Figure 3.108.

```
??? WHICH RAMTEK MONITOR DO YOU DESIRE TO UTILIZE ???

                1 -- FRONT BAY
                2 -- REAR BAY
                3 -- CENTER BAY
```

Figure 3.108 Selection of Graphics Monitor for Display.

The desired response to this query is the number corresponding to the monitor you intend to use. Should there be an error in making this response, the statement shown in Figure 3.109 will be presented.

```
PLEASE MAKE YOUR SELECTION (1, 2, OR 3) FROM THE MENU.
          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.109 ERROR -- Graphics Monitor Selection.

When you enter "RETURN" (as shown in Figure 3.111), you will again be presented with the query shown in Figure 3.108, and can reenter your response.

The first time you invoke this module in a system session, the information shown in Figure 3.110, a summary of the capabilities of the module, will be presented.

```
BATTLE GROUP ASSET MANAGEMENT
DECISION SUPPORT SYSTEM

* SENSOR MODULE *

THIS IS THE SENSOR MODULE FOR THE BATTLE GROUP ASSET
MANAGEMENT DECISION SUPPORT SYSTEM. IN THIS MODULE,
YOU CAN GRAPHICALLY DISPLAY YOUR BATTLE GROUP'S AIR,
SURFACE, SUBSURFACE, AND FIRE CONTROL SENSOR COVERAGE
AREAS, AS WELL AS POSITIONS, AND EXPERIMENT WITH THOSE
COVERAGE AREAS BY MOVING A UNIT AND OBSERVING THE
EFFECT ON COVERAGE. THE NECESSARY COMMANDS ARE SIM-
ILAR TO THOSE YOU UTILIZED IN THE STATUS MODULE, AS
SHOWN IN THE NEXT FRAME.

*** PRESS RETURN TO CONTINUE ***
```

Figure 3.110 SENSOR Module Description.

While you have seen the procedure to enter "RETURN" before, Figure 3.111 shows the format for the entry of the RETURN command as required here.

```
KB  --    <cr>
VR  --  "Carriage Return"
```

Figure 3.111 Entry of "CARRIAGE RETURN" or "RETURN".

When you continue, you will be presented with the module command options, which are shown in Figure 3.112. The entry of these commands is similar to the format and structure of those commands which you utilized in the STATUS Module.

The desired response to this query is the one or two segment entry shown in the module command options. As you saw in

```
                * SENSOR MCDUIE COMMANDS *

DISPLAY POSITIONS              DISPLAYS POSITIONS OF AIL
                               FORCE UNITS
        SURFACE                DISPLAYS FORCE SURFACE
                               RADAR COVERAGE
        AIR                    DISPLAYS FORCE AIR RADAR
                               COVERAGE
        SONAR                  DISPLAYS FORCE SONAR
                               COVERAGE
        FCRADAR                DISPLAYS FORCE FC RADAR
                               COVERAGE
    (AFTER COMPLETION OF ANY OF THE ABOVE COMMANDS
     YOU WILL BE ASKED IF YCU DESIRE TO MOVE A UNIT
     OR DISPLAY A THREAT AXIS.)

EXIT                           RETURN TO THE MAIN MCDUIE

PLEASE ENTER YOUR SENSOR MODULE COMMAND
```

Figure 3.112 SENSOR Module -- Command Formats.

the STATUS rodule, the system will look at the command you enter, and break the command into segments. The key tc the evaluatien cf the command in this module is the first word, DISPLAY cr EXIT. We will discuss each of these options, and their respective second segments in the fcllcwing sectiens. If there is a mistake made in entering your command, the statement shown in Figure 3.113 will be presented.

```
PLEASE REENTER YCUR COMMAND EXACTLY AS SHOWN IN THE
SELECTIONS LIST.
```

Figure 3.113 ERROR -- SENSOR Module Command Entry.

1. SENSOR Module -- Returning to the MAIN Module

If you desired to return to the MAIN module, you would make the following entry in response to the query shown in Figure 3.112.

KB -- EXIT <cr>
VR -- "Return to Main Module"

2. SENSOR Module -- Display of Force Positions

If you desired to display the positions of the units in the battle group, you would make the following entry in response to the query shown in Figure 3.112.

KB -- DISPLAY POSITIONS <cr>
VR -- "Display" "Positions"

As a result of this entry, you would have displayed on the graphics monitor, the relative positions of all force units, as indicated by the locations of their names. Additionally, on the terminal screen, you would see a presentation of the positions of the battle group units, as shown in either Figure 3.89 or Figure 3.90 (determined by which coordinate system, polar or cartesian, is being utilized). This display will be followed by

*** PRESS RETURN TO CONTINUE ***

To continue, you would make the entry shown in Figure 3.111. When you continue, you will have the opportunity to utilize the other features of this module, enlarging the display, and displaying the threat sector and/or cartesian coordinate axes. The operations of these features will be discussed in later topics of this section. You will not, however, have the opportunity to move any units, as you would in the other displays of this module.

3. SENSOR Module -- Display of Force Surface Radar Coverages

This feature of the SENSOR module allows you to display the coverage areas of the surface search radars on each unit in the force. In response to the query shown in Figure 3.112, you would make the following entry to initiate this display.

```
KB --              DISPLAY SURFACE    <cr>
VR -- "Display" "Surface Search Radars"
```

This command initiates a display of the relative positions of each unit in the force, with units identified by name. Additionally, around each unit will be a circle scaled to the surface search radar installed onboard that unit. The radars and their respective ranges are shown in Table VII. This display will be presented on the graphics monitor. On the terminal screen you will see the names of the units in the battle group, with the respective onboard radar. The format of the terminal screen display is shown in Figure 3.114.

```
        * BATTLE GROUP SURFACE SEARCH RADARS *
   UNIT NAME              RADAR              RANGE

         *** PRESS RETURN TO CONTINUE ***
```

Figure 3.114 DISPLAY -- Battle Group Surface Search Radars.

TABLE VII

DSS Surface Search Radars

Radar	Range (nm)
AN/BPS-15	20.0
AN/BPS-14	20.0
AN/SPS-10	30.0
AN/SPS-55	35.0
AN/SPY-1	35.0

You would continue, from the display shown in Figure 3.114, by making the entry described in Figure 3.111. When you continue, you would be offered the options of enlarging the plot, displaying the threat sector, and displaying the cartesian coordinate axes. These features are discussed in succeeding topics of this section. In addition, once the plot contains the information you desire, you can experiment with coverage areas by moving up to ten (10) units. The process involved with moving the units is discussed at the end of this section.

4. SENSOR Module -- Display of Force Air Search Radars

This feature of the SENSOR module allows you to display the coverage area of each of the air search radars on the battle group units. You would invoke this feature by making the following entry in response to the query shown in Figure 3.112.

KB -- DISPLAY AIR <cr>
VR -- "Display" "Air Search Radars"

This command would result in the display of all units in the battle group, in their relative positions, and identified by name. Around each unit would be a circle scaled to the

appropriate air search radar onboard that unit. The range characteristics of the air search radars in the database are shown in Table VIII. Additionally, on the terminal screen, the composition of the air search radars within the battle group would be displayed. The format of this display is shown in Figure 3.115.

```
        * BATTLE GROUP AIR SEARCH RADARS *
UNIT NAME          PRIMARY      SECONDARY          RANGE
        *** PRESS RETURN TO CONTINUE ***
```

Figure 3.115 DISPLAY -- Air Search Radars.

TABLE VIII

DSS Air Search Radars

Radar	Range (nm)
AN/SPS-48C	220.0
AN/SPS-49	250.0
AN/SPS-58	250.0
AN/SPS-43A	270.0
AN/SPS-37A	260.0
AN/SPS-52	230.0
AN/SPS-40	240.0
AN/SPS-39	290.0
AN/SPY-1	300.0

You would continue, following the display in Figure 3.115, by making the entry shown in Figure 3.111. Following the display of the air search radar coverages, you

would have the opportunity to utilize the other module features of changing the size of the screen display (Enlarge), and displaying the threat sector and/or cartesian coordinate axes. These topics are covered in succeeding sections. Once the plot is as you desire, you will be able to experiment with air radar coverages by moving a unit and observing the resultant change in coverage. This feature is discussed at the end of this section.

5. SENSOR Module -- Display of Force Fire Control Radar Coverages

This capability of the SENSOR module allows you to display the coverage areas of the fire control radars installed onboard the units of the battle group. The display would show the units in the force, in their relative positions, and identified by name. Around each unit would be a circle of radius scaled to the respective fire control radar installed on that unit. Table IX shows the ranges for the fire control radars in the system.

You can invoke this capability from the query shown in Figure 3.112 by making the following entry.

KB -- DISPLAY FCRADAR <cr>
VR -- "Display" "Fire Control Radars"

In addition to the coverage display on the graphics monitor, a chart of the units and their respective fire control radars would be displayed on the terminal screen. The format for this display is shown in Figure 3.116.

As you can see from the information displayed in Figure 3.116, the name of the unit as well as the types of primary and secondary fire control systems, as applicable, with the

TABLE IX

DSS Fire Control Radars

Radar	Range (nm)
MK-91	12.0
AN/SPG-55A	120.0
AN/SPG-49	100.0
AN/SPW-2	100.0
MK-40	80.0
AN/SPG-51	80.0
MK-7	40.0
MK-76	40.0
MK-74	40.0
MK-56	40.0
MK-99	40.0
MK-68	40.0
MK-92	40.0
AN/SPG-53	60.0
AN/SPG-60	50.0
MK-13	40.0
AN/SPQ-9	20.0
AN/SPG-35	35.0

```
        * BATTLE GROUP FIRE CONTROL RADARS *
UNIT NAME          PRIMARY          SECONDARY          RANGE
          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.116 DISPLAY -- Fire Control Radars.

range of the longest range system are shown. After the graphics and terminal displays are complete, you can continue by making the entry shown in Figure 3.111. When you continue, you will have the opportunity to utilize the other features of this module, enlarging the size of the graphics plot, and displaying the threat sector and/or the cartesian coordinate axes. These capabilities are

discussed in succeeding sections. Once the substance of the plot is as you desire, you will be able to experiment with the coverage areas by changing the position of a unit and observing the effect on coverage. This feature is discussed at the end of this section.

6. SENSOR Module -- Display of Force Sonar Coverage

This feature of the SENSOR module allows you to display the coverage areas of each of the ship mounted sonars in the battle group. This capability will show the direct path range for all force sonar systems. Additionally, when you indicate the conditions exist, the display will include the convergence zone coverages for those equipments which are capable of a CZ operating mode. You invoke the sonar coverage display by making the following response to the query shown in Figure 3.112.

KB -- DISPLAY SONAR <cr>
VR -- "Display" "Sonar Systems"

Once you designate that you desire to see the sonar coverages, you will next be queried on the existance of convergence zone conditions. This query is shown in Figure3.117, and the desired response is a YES/NO answer.

```
??? DO CONVERGENCE ZONE CONDITIONS EXIST ???
(YES OR NO)
```

Figure 3.117 Query -- Existance of Convergence Zone.

Should you make an error in entering the YES/NO response, you would see the following on the screen, after which you can reenter your YES/NO response.

PLEASE ENTER "YES" OR "NO."

Remember, DO NOT enter the quotes. If you indicate that convergence zone conditions exist, those sonars which are CZ capable will be flagged to show a 30 nautical mile annulus on the graphics monitor. The overall display will show the units in the battle group in their relative positions, and identified by name. Surrounding each unit will be first, a "cyan" circle representing the CZ annulus (if the unit has a CZ capable sonar, AND you indicate the conditions exist), and a "green" circle scaled to the direct path range of the sonar onboard that unit. Table X shows the DSS sonars with their direct path ranges and their CZ capability.

TABLE X

DSS Sonar Systems

Sonar	DP Range (nm)	CZ Capable
AN/BQQ-5	Passive	No
AN/BQS-15	3.0	No
AN/BQQ-2	6.0	Yes
AN/BQS-6	3.0	No
AN/BQR-7	Passive	No
AN/BQS-12	3.0	Yes
AN/SQS-23	2.0	No
AN/SQS-26	4.0	Yes
AN/SQQ-23	Passive	No
AN/SQS-53	4.0	Yes
AN/SQS-56	3.0	Yes

In addition to the display of the coverage areas on the graphics monitor, a summary of the sonars in the battle group, with respect to unit capabilities, is presented on the terminal screen. The format for this display is shown in Figure 3.118.

```
        * BATTLE GROUP SONAR SYSTEMS *
UNIT NAME              SONAR              RANGE
     * ** PRESS RETURN TO CONTINUE ***
```

Figure 3.118 DISPLAY -- Battle Group Sonar Systems.

You would continue by entering "RETURN" as shown in Figure 3.111. When you continue, you will have the opportunity to utilize the other features of this module, enlarging the size of the plot, displaying the threat sector and/or cartesian coordinate axes. The functions of these features are discussed in succeeding sections. Once the plot is as you desire, you will have the opportunity to experiment with the sonar coverages by changing the position(s) of up to ten units and observing the effects on coverage. These procedures are discussed at the end of this section.

7. Incorporation of AEW Radar Coverages

Once the organic sensor assets of the battle group have been displayed, regardless of the capability (air, surface, etc.), you will be offered the opportunity to display the coverage area of either an E-3A or E-2C AEW aircraft. Within this feature, you will also have the ability to input a specific coverage range for the

respective radar onbcard the selected aircraft, or utilize the system default range. The format for the query to invoke this feature is shown in Figure 3.119.

```
YOU HAVE THE OPTION OF PLACING AN "AWACS" OR A
"HAWKEYE" ON STATION.

     ??? WOULD YOU LIKE TO DO THIS ???

(YES CR NO)
```

Figure 3.119 Query -- Utilization of an AEW Aircraft.

If you indicate that you desire to place the aircraft on station, and enter "YES," you will next be asked which type cf aircraft you desire to utilize. The format for this query is shcwn in Figure 3.120.

```
??? WHICH AIRCRAFT WOULD YOU LIKE TO POSITION ???
          1 --  E-3A  SENTRY  (AWACS)
          2 --  E-2C  HAWKEYE

(ENTER 1 or 2)
```

Figure 3.120 Query -- Determination of Type of AEW Aircraft.

The format of the desired response is straightfoward. Should an error occur in making this response, you will be asked tc reenter your selection. The next queries you will be presented with address the range of the radar onboard the

aircraft you select. The respective query sequences are covered in the next two sections.

a. Determination of E-3A Radar Range

If you selected the E-3A aircraft in response to the query shown in Figure 3.120, you will be asked if you desire tc utilize the system default range for the AN/APY-1, or input ycur own range. The format of this query is shown in Figure 3.121.

```
THE AN/APY-1 RADAR ONBOARD THE E-3A AIRCRAFT HAS BEEN
GIVEN A SYSTEM RANGE OF 350 NM.  YOU HAVE THE OPTION
OF ENTERING YCUR CWN RANGE IF YOU DESIRE.  IF YOU
DESIRE TO USE THE SYSTEM RANGE, PRESS "CARRIAGE RE-
TURN," OTHERWISE, ENTER THE RANGE YOU DESIRE.

(LIMITS 1 - 500 NM).
```

Figure 3.121 Determination of AN/APY-1 Range.

If ycu desire to use the system range, simply enter "RETURN," as shown in Figure 3.111. If you desire to use your cwn range, for example, 200 nm, you would make the follcwing entry.

KE -- 200 <cr>

VE -- "Two" "Zero" "Zero" "Carriage Return"

b. Determination of E-2C Radar Range

If you selected the E-2C aircraft in response to the query shown in Figure 3.120, you will be asked if you desire tc use the system default range for the AN/APS-125. The fcrmat of the query is shcwn in Figure 3.122.

```
THE AN/APS-125 RADAR ONBOARD THE E-2C AIRCRAFT HAS
BEEN GIVEN  A SYSTEM RANGE OF 250 NM.  YOU HAVE THE
OPTION OF ENTERING YUR OWN RANGE IF YOUR DESIRE.  IF
YOU DESIRE TO USE THE SYSTEM RANGE, PRESS "CARRIAGE
RETURN," OTHERWISE, ENTER RANGE YOU DESIRE.

(LIMITS 1 - 500 NM).
```

Figure 3.122 Determination of AN/APS-125 Range.

The format for the desired response to this query is identical to that of entering the AN/APY-1 range.

c. Determination of AEW Station

Once the AEW aircraft has been identified, you will next be asked to enter the position of its station. The format for this entry is different from the bearing/range input you made for the ships. For this input, the bearing/range entry will be made as one response, and the range will be entered in nautical miles. The formats for the position query and the desired response are shown in Figures 3.123 and 3.124, respectively.

```
??? WHAT IS THE BEARING AND RANGE OF THE AEW STATION
    FROM ZZ ???

(ENTER AS "BBB RRR" WITH BEARING IN DEGREES TRUE, AND
RANGE IN NAUTICAL MILES.      E.G. BEARING 330 RANGE
200 NM WOULD BE ENTERED AS:  330 200)
```

Figure 3.123 Determination of Position of AEW Station.

If you desired to place the AEW aircraft at a station bearing 225 degrees true, 150 nautical miles from ZZ, you would make the following entry. (The voice format is somewhat cumbersome!)

```
KB --          225      150        <cr>
VR --  "Two" "Two" "Five" "Space" "One" "Five"
       "Zero" "Carriage Return"
```

Figure 3.124 Voice/Keyboard Response for AEW Station.

Once the position of the AEW station has been entered, the applicable coverage of the onboard radar will be displayed, and you will be cycled to the option to enlarge the view, the next topic.

8. Enlarging the Size of the Graphics Display

Once the display of the desired SENSOR module feature has been completed, you will be queried as to whether you desire to ENLARGE the size of the plot. When the graphics plot is initially established, the dimensions of the screen are 1000 nm by 950 nm. In some cases, this scale is too large to accurately view the information represented. This is particularly true when displaying positions, or short range radar or sonar capabilities. To allow you the opportunity to vary the scale of the plot to meet your needs, you will have the option of ENLARGING the display. The query addressing this feature is shown in Figure 3.125.

The desired response to this query is YES or NO. The formats for these response options are presented again, as a refresher. Should an error occur in making the YES/NO response, the following will appear, after which you can reenter the response.

```
??? WOULD YOU IIKE TO ENLARGE THIS VIEW ???
(YES CR NO)
```

Figure 3.125 Query -- Enlarge the View.

PLEASE ENTER "YES" OR "NO"

Remember not to enter the quctes! Here are the correct respcnse formats.

KE	--	YES <cr>	or	NO	<cr>
VR	--	"Affirmative"	or	"Negative"	

If you indicate you dc not desire to enlarge the plot, you will ccntinue tc the next module feature. If you do, however, desire to enlarge the plot, the query shown in Figure 3.126, addressing the number magnifications you want applied to the plot, will be presented.

```
??? BY HOW MANY TIMES WCULD YOU LIKE TO ENLARGE THE
    FICTURE ???
(ENTER THE DESIRED NUMBER (RANGE 2-5))
```

Figure 3.126 Query -- Amount of Enlargement.

This query will appear only once, meaning you can only change the scale cne time with each sensor capability display. If the new scale is not the plot size you desire,

you would have to return to the module menu (continue through the end of the sequence), and reinitiate the display of the capability. The desired response to the query shown in Figure 3.126 is the number corresponding to the relative increase in the plot size you prefer. If, for example, you desired to enlarge the plot four (4) times, you would make the following entry.

KB -- 4 <cr>
VR -- "Four" "Carriage Return"

This would cause the plot to be redisplayed at a scale four times the initial view size. The plot would now have the dimensions of 250 nm by 237 nm. The coverage currently being displayed, as well as any follow on feature, will maintain this new scale.

The system will check your response to the query in Figure 3.126 against the allowable range for the entry (2-5). If your response is not within this range, the statement shown in Figure 3.127 will be shown.

```
PLEASE RESTRICT YOUR ENTRY TO THE RANGE 2 - 5.
```

Figure 3.127 ERROR -- Enlargement Scale Not Within Limits.

Should an error occur, after the warning, simply reenter your response for the amount of enlargement (2 - 5 times).

9. Displaying the Threat Sector and Cartesian Coordinate Axes

Cnce the size of the display is set, and you are satisfied with the scale of the plot, you will next have the cpportunity to display the cartesian coordinate axes and/or display cr modify the threat sector. The query shown in Figure 3.128 addresses these capabilities.

```
??? WCULD YOU LIKE TO SEE EITHER OF THE FOLLOWING ???

            1 -- VERTICAL PLOT AXES
            2 -- THREAT SECTOR

(ENTER THE APPROPRIATE NUMBER OR PRESS "CARRIAGE RE-
TURN" TO CONTINUE)
```

Figure 3.128 Query -- Threat Sector/Vertical Plot Axes.

You will cycle to this or the query shown in Figure 3.129, each time you make a change to the plot by moving a unit (discussed later). If an error occurs in making this response, the warning shown in Figure 3.113 will be presented, after which you can reenter your response. If, through the course of experimenting with coverages, you have already displayed the VERTICAL PLOT AXES, you would then only be asked if you desire to display, or if it is already displayed, redefine the THREAT SECTOR. This query is shown in Figure 3.129.

The desired response to the query shown in Figure 3.128 is the YES/NO entry which has been discussed before. If, you do nct desire to display either of these features, ycu would simply enter "RETURN" as shown in Figure 3.111, and you will cycle to the next module feature, changing the positions of

```
??? WOULD YOU LIKE TO DISPLAY OR REDEFINE THE THREAT
    SECTOR ???
(YES CR NO)
```

Figure 3.129 Query -- Display/Redefine Threat Sector.

the units. This feature is discussed at the end of this section. Let's first look at each of these display features (threat sector/cartesian grid) and their query sequences individually.

a. Display of the Cartesian Coordinate Grid

If you desired to display the cartesian coordinate grid (VERTICAL PLOT AXES), you would make the following entry in response to the query shown in Figure 3.128.

KB -- 1 <cr>
VR -- "One" "Carriage Return"

This response will immediately cause the graphics monitor display to be refreshed, this time displaying the cartesian grid, scaled to your enlarged plot, if applicable, along with the capability coverage you are viewing. Until you erase the graphics monitor view (return to the module menu), the grid will be continuously displayed. Once the grid has been displayed, you will be given the query shown in Figure 3.129, to provide you the opportunity to display the threat sector. We will now look at the sequences involved with the display of the threat sector.

b. Display of Threat Sector

You would cause the threat sector to be displayed by making the appropriate response to the queries

shown in Figure 3.128, or Figure 3.129. There are two different query sequences which follow the response to display the sector. These sequences are keyed to whether the sector is already being displayed. If the sector is already displayed, then you will be given the opportunity of redefining the sector. We will look at both cases.

(1) Threat Sector Initial Display. If the threat sector has as yet not been displayed, the first query you will see is shown in Figure 3.130.

```
        ??? WHAT IS THE THREAT BEARING ???
(ENTER BEARING IN DEGREES (0 - 359))
```

Figure 3.130 Query -- Defining Threat Bearing.

If the force faced a threat from a bearing of 300 degrees true, the following entry would be made in response to the query shown in Figure 3.130.

```
KB --                    300                <cr>
VR -- "Three" "Zero" "Zero" "Carriage Return"
```

The system will check the entry to ensure it is within the authorized limits (0 - 359), and should it not be within those limits, the following warning will appear, after which you can reenter your threat bearing.

YOUR ENTRY HAS NOT BEEN ACCEPTED. PLEASE REENTER THE THREAT BEARING IN DEGREES (0 - 359).

Once the threat bearing has been determined, you will next be asked for the width of the threat sector. This query is shown in Figure 3.131.

```
??? WHAT IS THE THREAT SECTOR WIDTH ???
(ENTER IN DEGREES (0 - 360))
```

Figure 3.131 Query -- Threat Sector Width.

As an example, if the threat sector is 90 degrees wide, the following would be the correct entry in response to this query.

KB -- 90 <cr>
VR -- "Nine" "Zero" "Carriage Return"

If a mistake were to occur when making this response, the following warning would appear, after which you could reenter the threat sector width.

YOUR ENTRY HAS NOT BEEN ACCEPTED. PLEASE REENTER THE THREAT SECTOR WIDTH IN DEGREES (0 - 360))

Once the threat bearing and sector width have been correctly input, the graphics monitor will now redisplay all the current information, plus the threat sector. The sector will be marked in red, centered on the threat bearing, and originates at "ZZ." Now that the threat sector has been displayed, each time you cycle through the query shown in Figure 3.129, you will have the opportunity to redefine the existing sector, if you so desire. This is the topic of the next section.

(2) Redefining the Threat Sector. If you desired to redefine an already existing threat sector, you would enter "YES" to the query shown in Figure 3.129. This response will result in the query shown in Figure 3.132,

presenting the parameters of the existing sector to you. As shown, the query reflects the sector parameters which were used in the previous example.

```
THE THREAT SECTOR IS CURRENTLY 90 DEGREES WIDE, CEN-
TERED ON A BEARING OF 300 DEGREES TRUE.

          ??? IS THIS STILL CORRECT ???

(YES OR NO)
```

Figure 3.132 Description of Existing Threat Sector.

The desired response is YES or NO. If you indicate that the current sector is correct, by entering YES, you will continue to the module feature where you can experiment with unit positions. If you would like to change/redefine the sector, and enter NO, you will repeat the query sequences starting with that shown in Figure 3.130, and discussed above. Should an error occur in making the YES/NO response, you would be asked to reenter the response.

10. Experimenting with Moving a Unit

A significant feature of the computer graphics capabilities of this DSS is allowing the user to experiment with the effect on sensor (or weapons system, discussed later) coverage of moving a unit. To afford you the opportunity to redeploy the forces of the battle group, in order to best grasp the optimum overall coverage effectiveness, this DSS feature allows you to move up to ten (10) units. (The limit of 10 was determined based on the amount of clutter on the graphics monitor when an inordinate number of ships were

moved, thereby displaying both their old and new positions, and coverages.) Each of these ten units can be moved an indefinite number of times, however. Unfortunately, the DSS has not been designed to allow you to move the AEW aircraft, once they are in place. This change in unit position is not to be confused with the changing of positions in the STATUS module. The position change in this module is temporary and will not be made permanent, as you will see. The query utilized to invoke this feature is shown in Figure 3.133.

```
??? DO YOU DESIRE TO EXPERIMENT WITH COVERAGES BY
    MOVING A UNIT ???
(YES OR NO)
(YOU CAN INDIVIDUALLY MOVE UP TO TEN (10) UNITS.)
```

Figure 3.133 Query -- Move a Battle Group Unit.

The desired response to this query is "YES" or "NO," the format for which you have seen before. If you indicate that you desire to move a unit, and enter "YES," the first query you will see is to identify the unit you desire to move. The format of this query, with a representative ship names, is shown in Figure 3.134.

If an error occurs when making this response, or the name entered cannot be matched to the names of the battle group units, you will be asked to reenter the name of the unit you desire to move. Once the unit to be moved is identified, you would next be asked for the new position of that unit.

```
?? WHAT IS THE NAME OF THE UNIT YOU DESIRE TO MOVE ??
 CARL VINSON        PAUL F FOSTER          CALIFORNIA
```

Figure 3.134 Query -- Name of the Unit to be Moved.

The format of this query is based on the type of coordinate system (polar or cartesian) in use. The query/response sequences, however, are identical to those used in the BUILD module. If you are using the polar coordinate system, you will be asked for the bearing and range of the ship's new position from "ZZ." If you are using the cartesian system, you will be asked for the quadrant, x and y positions of the unit. Since these sequences are ones with which you are already familiar, they will not be repeated here. If you need to review their formats, you should refer to the appropriate section of the BUILD module. Remember, the new position is of a temporary nature until you state otherwise.

When the new position of the unit has been entered, the display on the screen will be repeated, this time, showing the new as well as the current system position for the unit you moved. This contrasting display will give you a feel for the dynamics of the change you made. Once the new display has been presented, you will be asked if you desire this NEW position be made permanent. The format for this query is shown in Figure 3.135.

The desired response to this query is "YES" or "NO," the format of which we have discussed before. If you do not want this position change to be made permanent, enter "NO," and you will cycle to the query regarding the display of the threat sector or cartesian grid, as appropriate. For the

```
??? DO YOU WANT THIS CHANGE TO BE MADE PERMANENT ???
(YES CR NO)
```

Figure 3.135 Query -- New Position to be Made Permanent.

remainder of the capability display, however, the new position of the unit will be displayed along with the current system position. You can change the position of up to ten (10) units. You can also come back to any unit and make another position change if you desire. When you no longer indicate that you desire to change the position of a unit, you will complete the full display capability of this module, and you will be advised that the displayed graphics will be erased when you continue. This warning is shown in Figure 3.136.

```
** CAUTION **  --- THE DISPLAYED GRAPHICS WILL BE
ERASED WHEN YOU CONTINUE
        *** PRESS RETURN TO CONTINUE ***
```

Figure 3.136 WARNING -- Erasure of Displayed Graphics.

You would continue by entering "RETURN" as shown in Figure 3.111, and you will be returned to the module menu (Figure 3.112).

K. WEAPCNS MODULE OPERATIONS

The functioning cf the WEAPONS module is oriented to computer graphics displays of the capabilities of the battle group weapons. The purpose cf this module is to allow you to display the force weapons capabilities in AAW, ASW, and ASUW. You would invoke the WEAPONS module from the query shown in Figure 3.6. The format for this response is shown in the fcllcwing example.

KB -- WEAPONS <cr>

VR -- "Weapons Module"

The initial view which you observe upon invoking this module is shcwn in Figure 3.137 (adjusted). The informaticn shown discusses the capabilities of the module. This display will cnly cccur after the first invocation of the module. You can continue by entering "RETURN," as shown in Figure 3.138.

```
        * BATTLE GROUP ASSET MANAGEMENT *
          DECISION SUPPORT SYSTEM

              * WEAPCNS MODULE*

THIS MODULE WILL ALLOW YCU TO DISPLAY THE FORCE WEA-
PCNS EFFECTIVENESS AREAS. YOU WILL BE ABLE TO DISPLAY
MISSILE, GUN, AND ASW WEAPCNS SYSTEMS, AS WELL AS
TCMAHAWK AND HARPCON EFFECTIVENESS AREAS. AS WITH
THE SENSCR MODULE, YOU WILL BE ABLE TO DISPLAY THE
CARTESIAN AXES, THE THREAT SECTOR, AND EXPERIMENT WITH
EFFECTIVENESS BY MCVING A UNIT AND OBSERVING THE RE-
SULTANT EFFECT.

        *** PRESS RETURN TO CONTINUE ***
```

Figure 3.137 WEAPONS Module Description.

```
KB  --        <cr>
VR  --   "Carriage Return"
```

Figure 3.138 Entry of "CARRIAGE RETURN" or "RETURN".

After you continue, the next display will be the one which will serve as the major menu for the module. The composition of this menu, which also functions as a query, is shown in Figure 3.139. This menu is a straightfoward explanation of the categories of the displays available.

```
                * WEAPONS MODULE OPTIONS *

  MISSILE   -- DISPLAY FORCE MISSILE SYSTEMS
  GUN       -- DISPLAY FORCE GUN SYSTEMS
  MSLGUN    -- DISPLAY FORCE MISSILE AND GUN SYSTEMS
  ASW       -- DISPLAY FORCE ASW WEAPONS SYSTEMS
  TCMAHAWK  -- DISPLAY FORCE TOMAHAWK WEAPONS SYSTEMS
  HARPCON   -- DISPLAY FORCE HARPOON WEAPONS SYSTEMS
  TCMHAR    -- DISPLAY FORCE TOMAHAWK AND HARPOON
               WEAPONS SYSTEMS
  EXIT      -- RETURN TO THE MAIN MODULE

??? WHAT IS YOUR SELECTION ???
```

Figure 3.139 WEAPONS Module Options.

The desired response to this query is the name of the option you desire. Should a keyboard error occur in making this reponse, the following warning will be displayed.

YOUR SELECTION WAS NOT ACCEPTED BY THE PROGRAM, AND YOU WILL HAVE TO REENTER

Once you have made your selection, the system will attempt to match your response to one of the options available. If no match is made, then the warning shown in Figure 3.140 will be displayed.

```
YOUR RESPONSE IS NOT RECOGNIZEABLE AS BEING FROM THE
AVAILABLE OPTIONS
          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.140 ERROR - No Match of Input To Available Options.

You can continue by entering RETURN, as shown in Figure 3.138. When you continue, the module menu (Figure 3.139) will again be displayed and you can reenter your response. Identical to the capabilities of the SENSOR module, this module also allows you several special features. These features include enlarging the size of the plot, display of the cartesian axes, display of a threat sector, and experimentally moving a unit and observing the effects the move has on weapons' coverage. You will also have the capability of imposing a CAP station on top of the ship system coverages. The pragmatics involved with responding to the queries associated with these special features have already been discussed in the SENSOR module operations section, and will not be discussed here. The points at which these features may be invoked in the WEAPONS module will, however, be emphasized. Additionally, as you have seen in the SENSOR module, in most cases, the graphics displays will be paralleled with a capabilities display on the terminal screen. The results of selecting each of the available

WEAPONS module options will be discussed in the following topics of this section.

1. Display of Available Options

In the succeeding sections, we will discuss the sequences involved with the various display options in this module. Following the explanation of the individual options, the sequences associated with enlarging the plot, stationing a CAP, and the display of the cartesian axes and threat sector are discussed with respect to the queries you will see to initiate them. For a detailed explanation of the functioning of each of these features, you should refer to the appropriate section in SENSOR MODULE OPERATIONS. The rationale for changing the scale would be that in some displays, the coverage areas of the capability selected could be seen in more detail when the scale is changed. The initial size of the graphics plot is 1000 by 950 nautical miles. You will be able to change this size to a minimum of 200 by 190 nautical miles, if you so desire. For a review of the operations of this feature, again, you should refer to the appropriate section within SENSOR MODULE OPERATIONS. Now we will look at the various WEAPONS module options.

a. Display of Force Missile System Coverage Areas

If you desired to display the coverage areas of the force missile systems, then your response would be as shown below.

KB -- MISSILE <cr>
VR -- "Guided Missile Systems"

The result of this entry would be a display on the graphics monitor of the battle group units in their relative positions, identified by name, and as applicable, surrounded by

a circle scaled to the capability of their installed missile system. The DSS ranges for individual missile systems are shown in Table XI.

TABLE XI

DSS Missile System Ranges

Missile System	Range (nm)
NSSMS (RIM-7)	7.0
SM1-ER (RIM-67)	40.0
BPDMS (RIM-7)	6.5
SM2-MR (RIM-66C)	50.0
SM1-MR (RIM66B)	25.0
SM2-ER (RIM-67B)	90.0

On the terminal screen would be a summary of the force systems, identified by ship name, primary system type, secondary system type, and longest operational range. The format for the terminal display is shown in Figure 3.141.

```
          * BATTLE GROUP MISSILE SYSTEMS *
UNIT NAME   PRIMARY SYSTEM   SECONDARY SYSTEM   RANGE
          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.141 Terminal Display - Battle Group Missile Sys.

Once the missile system capabilities have been displayed, you will be able to change the scale of the plot, or display the threat sector and cartesian coordinate axes, as well as experiment with changing a unit's position. The queries to initiate these features are shown in succeeding sections.

b. Display of Force Gun Weapons System Coverages

If you desired to display the force gun weapons system coverage areas, you would make the following response to the query shown in Figure 3.139.

KB -- GUN <cr>

VR -- "Gun Systems"

As a result of this input, you would see a display on the graphics monitor of all the battle group units in their relative positions, and identified by name. Additionally, you would see in the display, a circle of radius scaled to the onboard gun system capability, surrounding each unit. Table XII shows the DSS ranges for the available gun weapons systems.

TABLE XII

DSS Gun System Ranges

Gun System	Range (nm)
16"/50 (406 mm) MK7 MOD 0	20.0
5"/38 (127 mm) MK12 MOD 1	10.0
2mm/70 MK4	3.0
5"/54 (127 mm) MK42	13.0
5"/54 (127 mm) MK45	13.0
3"/50 (76 mm) MK22	10.0
76 mm (OTO MELARA)	8.0

On the terminal screen would be displayed the gun capabilities by ship name, gun system installed, and gun range. The format for this presentation is shown in Figure 3.142.

```
                * BATTLE GROUP GUN SYSTEMS *
UNIT NAME                SYSTEM                        RANGE
          *** PRESS RETURN TO CONTINUE ***
```

Figure 3.142 Battle Group Gun Systems.

Once the gun ranges are dislayed, you will be able to change the scale of the plot, and display the threat sector and cartesian coordinate axes, as well as experiment with changing a unit's position. The queries to initiate these features are shown below.

c. Display of Force Missile and Gun Weapons Systems

If you desire to display the force coverage areas with respect to <u>BOTH</u> missile and gun systems installed, then you would enter the following in rsponse to the query shown in Figure 3.139.

KE -- MSLGUN <cr>
VR -- "Both Missile and Gun Systems"

This input would initiate a display on the graphics monitor showing the coverage areas for both the missile (shown in "green"), and the gun systems (shown in "red") for the battle group. Refer to Table XI and Table XII for a summary of the ranges associated with the various missile and gun systems available. Additionally, the type of

installed systems would be shown , by ship name, on the terminal screen. The format of this display is shown in Figure 3.143.

```
        * BATTLE GROUP MISSILE AND GUN SYSTEMS *
 UNIT NAME          MISSILE SYSTEM          GUN SYSTEM
            *** PRESS RETURN TO CONTINUE ***
```

Figure 3.143 Force Missile and Gun Systems.

Following these displays, you will be able to enlarge the plot, and display the threat sector and cartesian coordinate axes, as well as experiment with changing a unit's position. The queries and associated responses, required to initiate these features, are shown in succeeding sections of this module.

d. Display of Force ASW Weapons System Coverages

If you desire to display the force ASW weapons systems, you would enter the following, in response to the query shown in Figure 3.139.

KB -- ASW <cr>
VR -- "ASW Weapons Systems"

This response will generate a display on the graphics monitor which shows the battle group units in their relative positions, and identified by name. There are three capabilities addressed in the ASW display, helicopter (LAMPS/HS), ASROC/SUBROC, and torpedo. Each ship will have around it a circle representative of her respective

capability. The helicopter ranges are shown in "green," the ASROC/SUBROC ranges in "yellow," and the torpedo ranges in "cyan." The information displayed in Table XIII shows the system ranges associated with these systems.

TABLE XIII

DSS ASW System Ranges

System	Range(nm)
Helicopter (LAMPS/HS)	100.0
ASROC	4.8
SUBROC	25.0
MK46 Torpedo	2.0
MK48 Torpedo	10.0

Additionally, on the terminal screen the unit names, and their associated helicopter, ASW-Rocket, and torpedo capabilities are presented. The format for this display is show in Figure 3.144.

```
        * BATTLE GROUP ASW WEAPONS SYSTEMS *
UNIT NAME    HELICOPTER    ASW-ROCKET    TORPEDO
        *** PRESS RETURN TO CONTINUE ***
```

Figure 3.144 Battle Group ASW Weapons Capabilities.

The display would show YES/NO for helicopter, indicating that there is an ASW helicopter onboard that unit. It would additionally indicate the type of ASW-Rocket (ASROC/SUBROC), and type of torpedo which are onboard the unit. Following this display, you would be able to enlarge the plot and display the threat sector and cartesian coordinate axes, as well as experiment with changing the position of a unit. The queries and responses for initiating these features are shown in succeeding sections of this module.

e. Display of Force HARPOON Weapons Coverages

If you desired to display the coverage area of the force HARPOON weapons, then you would enter the following response to the query shown in Figure 3.139.

KB -- HARPOON <cr>
VR -- "HARPOON Weapons"

As a result of this input, you would see a display on the graphics monitor of the battle group units in their relative positions, and identified by name. Surrounding each HARPOON ship would be a circle (radius 60.0 nm). Additionally, the names of all battle group units with HARPOON would be presented on the terminal screen. The heading for this display is shown in Figure 3.145.

```
* BATTLE GROUP HARPOON UNITS *

<ship name>
<ship name>
<ship name>

*** PRESS RETURN TO CONTINUE ***
```

Figure 3.145 Battle Group HARPOON Units.

Following the display of this information, you will be able to enlarge the plot, and display the threat sector and cartesian coordinate axes, as well as experiment with changing the position of a unit. The query and response sequences for initiating these features are discussed in succeeding sections of this module.

f. Display of Force TOMAHAWK Weapons Coverage

If you desired to display the force TOMAHAWK weapons system coverage areas, you would enter the following in response to the query shown in Figure 3.139.

KB -- TOMAHAWK <cr>
VR -- "TOMAHAWK Systems"

This input would initiate a display on the graphics monitor of the battle group units in their relative positions, and identified by name. Those units with a TOMAHAWK capability would have around them, a circle of radius 400.0 nautical miles. Additionally, on the terminal screen, those units would be listed by name. The format for this listing is shown in Figure 3.146.

```
* BATTLE GROUP TOMAHAWK UNITS *

   <ship name>
   <ship name>
   <ship name>

*** PRESS RETURN TO CONTINUE ***
```

Figure 3.146 Battle Group TOMAHAWK Units.

Following this display, you will be able to enlarge the plot, and display the threat sector and

cartesian coordinate axes, as well as experiment with changing the position of a unit. The query and response sequences associated with initiating these features are discussed in succeeding sections of this module.

g. Display of Force TOMAHAWK and HARPOON Coverage Areas

If you desired to display the coverage areas of BOTH the force TOMAHAWK and HARPOON weapons systems, then you would enter the following in response to the query shown in Figure 3.139.

KB -- TOMHAR <cr>

VR -- "Both TOMAHAWK and HARPOON Systems"

Resulting from this entry would be a display on the graphics monitor of the battle group units in their relative positions, and identified by name. Surrounding those units that are capable, would be circles (TOMAHAWK in "green"/HARPOON in "red") scaled to the ranges previously discussed for these weapons. Following this display, you will be able to enlarge the plot, and display the threat sector and cartesian coordinate axes, as well as experiment with changing the position of a unit. The query and response sequences associated with initiating these features are discussed in succeeding sections of this module.

2. Positioning of CAP Stations

As you saw in the SENSOR module, with the stationing of an AEW aircraft, if you elect to display missiles, guns, or a combination of the two, in this module you will have the opportunity to station two (2) CAP sections. The query utilized to invoke this feature is shown in Figure 3.147.

```
YOU HAVE THE CPPORTUNITY OF PLACING TWO SECTIONS OF
F-14 CAP IN SUPPORT OF THE BATTLE GROUP.
          ??? WOULD YOU LIKE TO DO THIS ???
(YES CR NO)
```

Figure 3.147 Query -- Stationing of CAP.

The desired response to this query is "YES" or "NO." If you desired to place a CAPSTA in the system, and enter "YES," you would next be asked for the position of the station for each section, as applicable. The format of both the query and response for this position determination is identical to that in the SENSOR module for the AEW station. The format for the query is shown in Figure 3.148.

```
FOR CAPSTA NUMBER 1,
 ??? WHAT IS THE BEARING AND RANGE OF THE STATION
     FROM ZZ ???
(ENTER AS BEARING IN DEGREES TRUE, RANGE IN NAUTICAL
MILES.   E.G. BBB RRR)
```

Figure 3.148 Query -- Determination of CAPSTA Position.

Notice that the query addresses CAPSTA number 1. If you elect to have two CAPSTAS, the query would reflect the number of the second station. If you desired to position CAPSTA nr. 1 340 degrees true, 100 nautical miles from "ZZ," you would make the entry shown in Figure 3.149 .

```
KE  --          340 100          <cr >
VR  --  "Three" "Four" "Zero" "Space" "One" "Zero"
        "Zero" "Carriage Return"
```

Figure 3.149 Specification of CAPSTA.

If an error were to occur while making this entry, you would be so advised, and given the opportunity to reenter the correct position. After the position of the first CAP station has been entered, you will be asked if you desire to employ the second station. The format for this query is shown in Figure 3.150.

```
?? WOULD YOU LIKE TO EMPLOY THE SECOND CAP STATION ??
(YES CR NO)
```

Figure 3.150 Query -- Second CAP Station.

The desired response is "YES" or "NO." If you indicate that you want another CAPSTA, and enter "YES," you will sequence through the position determination query shown above. If you enter "NO,", you will cycle to the next feature of this module.

3. Enlarging the Size of the Weapons Coverage Display

The initial size of the graphics plot is 1000 nm by 950 nm. In some cases, this scale is inadequate to accurately view the coverages of the displayed weapons system.

In order to afford you the opportunity to change this scale, the query shown in Figure 3.125 is presented. You will be able to enlarge the plot up to five (5) times. For a review of the pragmatics of responding to this query, refer to the appropriate topic in the SENSOR MODULE OPERATIONS section.

4. Display of Threat Sector and Cartesian Coordinate Grid

Once the module option you have selected has been displayed, and you have adjusted the scale as required, you will be will be offered the option of displaying the threat sector and cartesian coordinate grid. The query/response sequences for initiating these features from this module, are the same as you exercised from the SENSOR module. The composition of these queries are shown in Figures 3.128 and 3.129. Figure 3.151, A repeat of Figure 3.128, is shown below.

```
??? WOULD YOU LIKE TO SEE EITHER OF THE FOLLOWING ???

                1 -- VERTICAL PLOT AXES
                2 -- THREAT SECTOR

(ENTER THE APPROPRIATE NUMBER OR PRESS "CARRIAGE RE-
 TURN" TO CONTINUE)
```

Figure 3.151 Query - Threat Sector/Cartesian Grid.

As you have seen in the discussion from SENSOR module operations, the desired response to this query is straightfoward. Remember also, that you can only display the Vertical Plot axes once. They will, in fact, remain on the screen once selected, until you select another module

option. Should you indicate display of the VERTICAL PLOT AXES, and they are already displayed, then you will see the following.

YOU HAVE ALREADY DISPLAYED THE VERTICAL PLOT AXES

*** PRESS RETURN TO CONTINUE ***

When you continue, you will be presented with the query shown in Figure 3.129, and essentially, your only available options are to display/change the threat sector, or continue. Should an error occur in making this response, the following will be presented.

PLEASE REENTER THE COMMAND EXACTLY AS SHOWN IN THE SELECTIONS LIST.

The query will again be displayed and you can reenter your response. To reiterate, a more in-depth discussion of these features is conducted in the appropriate topics of the SENSOR MODULE OPERATIONS section.

5. Experimentally Changing the Position of a Unit

The final capability of this module is the experimentation with changing the position of a unit. The intent of this feature is that the user can observe the effects on the weapons systems' coverage by making such a change. As you have seen in the SENSOR module discussion of this capability, you can experiment with up to ten (10) units. The number of times you move a unit is unrestricted. With each move, you will be allowed to make that new position permanent, or retain the original position of the unit within the database. On the graphics monitor, you will see the current weapons system display with which you are working. The refreshed display, however, will show the unit you selected for a position change in her new position, and a

reference line back to the current database position for that unit. Additionally, on the terminal screen will be displayed the respective weapon system onboard that unit. The query for initiating this feature is shown in Figure 3.152.

```
??? DO YOU DESIRE TO EXPERIMENT WITH THE COVERAGES BY
    MOVING A UNIT ???
(YES/NO)
```

Figure 3.152 Query - Changing a Unit's Position.

This query is displayed in conjunction with the queries for threat sector/cartesian coordinate grid displays. Each time you move a unit, you will then see the query shown in Figure 3.151 or 3.129. The system will cycle through these sequences twice before you finish with the current display of your selected weapons system. The desired response to the query shown in Figure 3.152 is the YES/NO input we have seen before. If you enter "YES," then you will next be queried regarding the name of the unit you desire to move, followed by the new position of that unit. The pragmatics of the query/response sequences associated with this capability are discussed in detail under that appropriate topics of the SENSOR module Operations section. Should you attempt to move more than ten (10) units, the warning shown below will be presented.

YOU HAVE AIREADY MOVED THE MAXIMUM ALLOWABLE NUMBER OF 10 UNITS

If your respcnse to the query shown in Figure 3.152 was "NO," one of two actions would be taken. If this is the first presentaticn of the query, you will be cycled to the query shown in Figure 3.151. If this is the second time the query has been presented, the system will determine that you are finished with the display of the current capability, and you will see the following displayed on the screen.

** CAUTICN ** --- THE DISPLAYED GRAPHICS WILL BE ERASED WHEN YOU CCNTINUE

*** PRESS RETURN TO CONTINUE ***

The current graphics display, with all of the features you have initiated, will remain on the graphics monitor until you ccntinue. Once you continue, you will be cycled to the module menu shown in Figure 3.139. If you desire to display ancther weapcns system capability, enter the appropriate cption. If you desire to return to the MAIN module, enter "EXIT." You must return to the MAIN module in crder to access another DSS module.

APPENDIX A
VOICE RECOGNITION COMMAND FORMATS

This appendix contains the foundation of the voice architecture supporting the Decision Support System. Unique to the format structure of discrete speech voice recognition primitives, the information contained in Table XIV constitutes the "prompts," voice command strings (when different from the "prompts") and the "output string" associated with the entries. This information is recorded on the tape accompanying this Thesis. A brief explanation of the procedures for creating a voice tape are appropriate at this point.

The Treshold Technology T-600 equipment utilized for this thesis requires three segments for each anticipated voice command. The details of "training" the machine for your voice can be obtained from the Man-Machine Interface Laboratory, at NPS. Basically, the three steps to establishment of a voice command are to first, determine a "prompt," second, input the "output" string associated with that "prompt" (maximum length for an "output" string is 16 characters), and third, "training" the machine with a voice command to which you want the "output" equated. The "prompt" and "output" are referenced by a three digit reference number (000 - 256). This equipment has a maximum capacity for 256 commands. Once you have input the "prompt" and "output," the "training" consists of speaking the phrase you desire so that the equipment can establish a reference for that particular voice pattern. Once this "training" has been completed, the machine will cause the appropriate "output" to be generated each time that command is made. Once you have completed the sequencing of command

establishment, your complete command vocabulary can be recorded on tape. Each subsequent time you desire to utilize the voice commands, you can load your voice command patterns into the T-600, and it can then act as a keyboard for entry of your responses. This overly simplifies the mechanics of creating the voice commands, however, the intent was to give you a general feel for the process.

A primary function of this appendix is to serve as a reference from which the acceptable voice commands for the system can be obtained. If there is no voice command string indicated, the "prompt" serves as the command string. With respect to the listings for the ships, by inclusion herein, the ship is verified to be residing in the Master Database for the Decision Support System.

TABLE XIV

Voice Recognition Command Structure

INDEX	PROMPT	COMMAND STRING	OUTPUT STRING
000	HELLO	"Log me on"	VOGAN<cr> (pass)<cr>
001	GAME	"Run DSS Program"	RUN DSS <cr>
002	DSS	"Decision Support System"	DSS
003	ENTER	"Carriage Return"	<cr>
004	RETURN		<cr> (line feed)
005	BATTLE GROUP	"Log Decision On"	DECISION<cr> (pass)<cr>
006	BLANK		(10 spaces)
007	NONE		N
008	ERASE		<cr> (10 spaces) <cr>
009	SPACE		(one blank)
010	PERMIT		PERMIT<cr>
011	GUITARRO		GUITARRO<cr>
012	LOS ANGELES		LOS ANGELES<cr>
013	INDIANAPOLIS		INDIANAPOLIS<cr>
014	LAJOLLA		LAJOLLA<cr>
015	MIDWAY		MIDWAY<cr>
016	CORAL SEA		CORAL SEA<cr>
017	RANGER		RANGER<cr>
018	KITTY HAWK		KITTY HAWK<cr>
019	HAWK		KITTY HAWK<cr>
020	CONSTELLATIO	"CONSTELLATION"	CONSTELLATION<cr>
021	CONNIE		CONSTELLATION<cr>
022	ENTERPRISE		ENTERPRISE<cr>
023	NIMITZ		NIMITZ<cr>
024	NEW JERSEY		NEW JERSEY<cr>
025	LONG BEACH		LONG BEACH<cr>
026	LEAHY		LEAHY<cr>
027	WORDEN		WORDEN<cr>
028	GRIDLEY		GRIDLEY<cr>
029	ENGLAND		ENGLAND<cr>
030	HALSEY		HALSEY<cr>
031	REEVES		REEVES<cr>
032	BAINBRIDGE		BAINBRIDGE<cr>
033	JOUETT		JOUETT<cr>
034	HORNE		HORNE<cr>
035	STERETT		STERETT<cr>
036	WILLIAM H		WILLIAM H (space)
037	STANDLEY		STANDLEY<cr>

038	FOX	FOX<cr>
039	TRUXTON	TRUXTON<cr>
040	YORKTCWN	YORKTOWN<cr>
041	WILSON	HENRY B WILSON<cr>
042	HB WILSON	HENRY B WILSON<cr>
043	MCCORMICK	LYNDE MCCORMICK<cr>
044	TOWERS	TOWERS<cr>
045	ROBISON	ROBISON<cr>
046	HOEL	HOEL<cr>
047	BUCHANAN	BUCHANAN<cr>
048	BERKELY	BERKELY<cr>
049	STRAUSS	JOSEPH STRAUSS<cr>
050	GOLDSBOROUGH	GOLDSBOROUGH<cr>
051	COCHRANE	COCHRANE<cr>
052	STODDERT	STODDERT<cr>
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063	YOUNG	JOHN YOUNG<cr>
064	OBRIEN	CBRIEN<cr>
065	MERRILL	MERRILL<cr>
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069	HILL	HARRY W HILL<cr>
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089	WHIPPLE		WHIPPLE<cr>
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094	FRANCIS HAMM	"FRANCIS HAMMOND"	FRANCIS HAMMOND<cr>
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097	DOWNES		DOWNES<cr>
098	BADGER		BADGER<cr>
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101	TRIPPE		TRIPPE<cr>
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105	OUELLET		OUELLET<cr>
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111	DUNCAN		DUNCAN<cr>
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117	ANTRIM		ANTRIM<cr>
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144	ROANOKE		ROANOKE<cr>
145	YES	"Affirmative"	YES<cr>
146	NO	"Negative"	NO<cr>
147	ZERO		0
148	ONE		1
149	TWO		2
150	THREE		3
151	FOUR		4
152	FIVE		5
153	SIX		6
154	SEVEN		7
155	EIGHT		8
156	NINE		9
157	MENU		MENU<cr>
158	BUILD	"Euild Module"	BUILD<cr>
159	STATUS	"Status Module"	STATUS<cr>
160	COMMS	"Comms Module"	COMMS<cr>
161	SENSOR	"Senscr Module"	SENSOR<cr>
162	WEAPONS	"Weapons Module"	WEAPONS<cr>
163	DATABASE	"Database Module"	DATABASE<cr>
164	SAVE	"Save Module"	SAVE<cr>
165	STOP		STOP<cr>
166	POLAR	"Polar Coordinate System"	POLAR<cr>
167	CARTESIAN	"Cartesian Coordinate System"	CARTESIAN<cr>
168	RED		R (space)
169	WHITE		W (space)
170	BLUE		B (space)
171	GREEN		G (space)
172	CARGRU	"Carrier Group"	COMCARGRU (space)

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173     CRUDESGRU     "Cruiser Destroyer Group"       COMCRUDESGRU (space)
174     DESRON        "Destroyer Squadron"            COMDESRON (space)
175     CO            "Commanding Officer"            CO, (space)
176     CTC                                           OTC<cr>
177     AAWC                                          AAWC<cr>
178     ASWC                                          ASWC<cr>
179     ASUWC                                         ASUWC<cr>
180     AREC          "Air Element Coordinator"       AREC<cr>
181     LEC           "LAMPS Element Coordinator"     LEC<cr>
182     EWC           "Electronic Warfare Coordinator" EWC<cr>
183     SEC           "Submarine Element Coordinator"  SEC<cr>
184     ORGANIZATICN                                  ORGANIZATION<cr>
185     EMBARK                                        EMBARK<cr>
186     TRUE                                          .TRUE.
187     FALSE                                         .FALSE.
188     INSERT        "Insert a Unit"                 INSERT<cr>
189     DELETE        "Delete a Unit"                 DELETE<cr>
190     REBUILD       "Bebuild Option"                REBUILD<cr>
191     TERMINATE                                     LOGO<cr>
192     CARL VINSCN                                   CARL VINSON<cr>
193     VINSON                                        CARL VINSON<cr>
194     TEXAS                                         TEXAS<cr>
195     DISPLAY                                       DISPLAY (space)
196     CHANGE        "Change Database"               CHANGE (space)
197     REMARKS                                       REMARKS (space)
198     MISSIONS      "Mission Areas"                 MISSIONS<cr>
199     POSITIONS                                     POSITIONS<cr>
200     TASS          "TASS Systems"                  TASS<cr>
201     TOMAHAWK      "TOMAHAWK Weapons"              TOMAHAWK<cr>
202     HELO          "Helicopter Units"              HELO<cr>
203     HARPOON       "HARPOON Weapons"               HARPOON<cr>
204     UNIT                                          UNIT (space)
205     EXIT          "Return to the Main Module"     EXIT<cr>
206     BOTH                                          BOTH<cr>
207     FORCE                                         FORCE (space)
208     AAW           "Antiair Warfare"               AAW<cr>
209     ASW           "Antisubmarine Warfare"         ASW<cr>
210     ASUW          "Antisurface Warfare"           ASUW<cr>
211     STR           "Strike Warfare"                STR<cr>
212     LOG           "Logistics Support"             LOG<cr>
213     NNN           "No Mission"                    NNN<cr>
214     AMW           "Amphibious Warfare"            AMW<cr>
215     COMMAND       "CWC Organization"              COMMAND<cr>
216     SSN           "Submarine"                     SSN
217     CV            "Aircraft Carrier"              CV
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218     CVN         "Nuclear Aircraft Carrier"      CVN
219     CG          "Guided Missile Cruiser"        CG
220     CGN         "Nuclear Guided Missile Cruiser" CGN
221     DD          "Destroyer"                     DD
222     DDG         "Guided Missile Destroyer"      DDG
223     FF          "Frigate"                       FF
224     FFG         "Guided Missile Frigate"        FFG
225     AOE         "Fast Combat Support Ship"      AOE
226     AOR         "Replenishment Oiler"           AOR
227     BB          "Battleship"                    BB
228     AFS         "Combat Stores Ship"            AFS
229     AO          "Fleet Oiler"                   AO
230     SONAR       "Sonar Systems"                 SONAR<cr>
231     MISSILE     "Missile Systems"               MISSILE<cr>
232     GUN         "Gun Systems"                   GUN<cr>
233     MSLGUN      "Both Missile and Gun Systems"  MSLGUN<cr>
234     ASWWEP      "ASW Weapons Systems"           ASW<cr>
235     TOMHAR      "Both TOMAHAWK and HARPOON
                      Systems"                      TOMHAR<cr>
236     FIREC       "Fire Control Radars"           FCRADAR<cr>
237     SURFACE     "Surface Search Radars"         SURFACE<cr>
238     AIR         "Air Search Radars"             AIR<cr>
239     FORMAT      "Review Formats"                FORMAT<cr>
240     ASROC                                       ASROC<cr>
241     SUBROC                                      SUBROC<cr>
242     THOUSAND                                    000<cr>
243     SUBRON      "Submarine Squadron"            COMSUBRON (space)
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