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PERFORMANCE SPECIFICATION
DIGITAL BATHYMETRIC DATA BASE - VARIABLE RESOLUTION (DBDB-V)

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1.1 Scope. This specification defines the content and format for the U.S. Naval Oceanographic Office NAVOCEANO Digital Bathymetric Data Base - Variable Resolution (DDBDB-V) product. DBDB-V is a digital bathymetric data base that provides ocean depths at various gridded resolutions.

1.2 Purpose. DBDB-V was developed by NAVOCEANO to support the generation of bathymetric chart products, and to provide bathymetric data to be integrated with other geophysical and environmental parameters for ocean modeling. This specification provides a description of the content, accuracy, data format, and design of the DBDB-V database.

1.3 Classification. DBDB-V data is a combination of different resolution gridded bathymetric data bases. The grid post spacing, defined in terms of geographic arc minutes will be 0.5, 1, 2 and 5 minutes for Version 1.0 of DBDB-V.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents

2.2.1 Specifications, standards, and handbooks The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the current Department of Defense Index of

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Director, National Imagery and Mapping Agency, ATTN: NIMA Customer Support/COD, 12310 Sunrise Valley Drive,, Reston, VA 20191-3449 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A **AREA MCGT**

Specifications and Standards (DODISS) and the supplement thereto, cited in a solicitation.

Department of Defense Standards

MIL-STD-600001 MC&G Accuracy Standard

MIL-STD-2414 Department of Defense, DMA Stock Number Bar Coding

2.2.2 Other Government documents, drawings, and publications This section is not applicable to this specification.

Navy Standards

Oceanographic and Atmospheric Master Library (OAML) Data Base Description for Digital Bathymetric Data Base - Variable Resolution (DBDB-V), Version 1.0, Commander, Naval Meteorology and Oceanography Command (COMNAVMETOCCOM), February 1997.

2.3 Non-Government publications. This section is not applicable to this specification.

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets, or standards) the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.3.

3.2 Accuracy. At the present, there is no formal requirement for absolute or relative accuracy of DBDB-V. The relatively coarse resolution of the 5, 2 and 1 minute grids provide only a generalized portrayal of the bottom configuration. The accuracy of the 5, 2 and 1 minute resolution grids is consistent with nautical products of the scale they were digitized from (Section 6.1.1). The following are included as program objectives only for the 0.5 arc minute bathymetry grid.

3.2.1 Absolute horizontal accuracy. The horizontal accuracy for the 0.5 minute grid in surveyed areas is $\leq$ 457 meters (0.25 nautical miles) Circular Error (C.E.) 90% with respect to World Geodetic System (WGS).

3.2.2 Absolute vertical accuracy. The vertical accuracy for the 0.5 minute grid in surveyed areas is $\leq$ 18 meters (10 fathoms) Linear Error (L.E.) 90 percent with respect to Mean Sea Level (MSL), using a standardized sound velocity in sea water of 1500 meters per second.

Note: Reference MIL-STD-600001, for accuracy definitions.

3.3 Datum.

3.3.1 Horizontal datum. The horizontal datum shall be referenced to WGS84. If the source is not referenced to WGS84, then it will be converted

from its original horizontal datum to WGS84. Note: Reference MIL-STD-600001, for accuracy definitions (see 2.2.1).

3.3.2 Vertical datum. The vertical sounding datum is Mean Sea Level (MSL) with the depth information expressed as meters, uncorrected at an assumed sound velocity of 1500 meters per second.

3.4 Units of measure. Units of measurement in this specification are generally given in the metric system. With very few exceptions, units of measurement for the DBDB-V will employ the metric system (see Appendix section 30.1.2).

3.5 DBDB-V Product Description. This format is intended for the purpose of production, storage and exchange of DBDB-V.

3.5.1 File description. DBDB-V format and storage requirements are defined in TABLE 1. The hierarchal structure of the directories and files is as follows:

```
<dbdbv_home>
      |- bin directory
      |      |- bin/bin_cmdline directory
      |      |- bin/bin_gui directory
      |
      |- change_utility directory
      |- command_line directory
      |- database directory
      |- gui directory
      |      |- gui/plot_utils directory
      |- sample directory
      |- doc directory
      |- qmake executable
```

TABLE 1 Storage requirements

Type	Filename	Size
Data Base Description document	doc/database.doc	63 Kb
Data Base		
Master Index File	database/master	10.5 Mb
Index File	database/index	1.8 Mb
Description File	database/descrip	1 Kb
Data File	database/data0	33 Mb
Test Data		
readme file	sample/readme.txt	5 Kb
test output file (point)	sample/point_sample.dat	1 Kb
test output file (great circle)	sample/gcp_sample.dat	24 Kb
test output file (MBR)	sample/mbr_sample.fin	35 Kb
Executables		
SGI GUI	bin/bin_gui/dbdbv_sgi	287 Kb
SUN GUI	bin/bin_gui/dbdbv_sun	304 Kb
HP GUI	bin/bin_gui/dbdbv_hp	521 Kb
SGI command line	bin/bin_cmdline/dbdbv_sgi	88 Kb
SUN command line	bin/bin_cmdline/dbdbv_sun	96 Kb
HP command line	bin/bin_cmdline/dbdbv_hp	112 Kb
Source Code		
GUI production access source code (including readme and makefiles)	gui/*.* & gui/plot_utils/*.*	683 Kb
Command line access source code (including readme and makefiles)	command_line/*.*	264 Kb
Change utilities (including executable and makefiles)	change_utility/*.*	37 Kb

For operational use the data base files and an executable version of the GUI production access software or command line access software is required to be loaded on the computer systems's hard disk. Source files, makefiles, readme files and test data are not required for system operation. The GUI production access software is not required to be loaded if the user intends to integrate DBDB-V into user application software. The basic access software (command line software) is provided without a GUI interface and is intended for use by system developers to integrate DBDB-V directly into their application software without the GUI. The test data files and their accompanying readme file are provided to verify proper system application and the performance of the software and data base. An ASCII text version of this Data Base Description document is also provided as part of the deliverable.

3.5.2 Logical characteristics. The data base for DBDB-V consists of four file types. The depth information is expressed in meters, uncorrected at an assumed sound velocity of 1500 meters per second. The first file is a Master Index File that contains a pointer or byte address to each populated one degree cell for each of the resolutions available. The second file is an Index File that provides a linkage to the detailed depth values, as well as, a linkage to a description file associated with the depths. The third file, or Description File, provides details on the compressions, scaling and storage of the depth information. The fourth file is the Data File that contains the depth values for a one degree cell of a specific resolution. The data base structure is flexible enough to allow the addition of more resolutions beyond those available in the current version, including those that are of

undetermined grid size.

3.5.3 File characteristics.

3.5.3.1 Master Index file characteristics. The Master Index File contains entries for each one degree by one degree cell for each of the grid resolutions represented in DBDB-V. There are 65,160 geographically ordered entries for each unique grid spacing. The entries are ordered first by increasing grid resolution (5, 2, 1 and 0.5), and then geographically first by latitude (starting at the southernmost latitude), then by longitude (starting at the prime meridian and moving east). FIGURE 1 applies. Each entry is the byte address in the Index File where the Index File entries for this one degree cell at this grid interval begins. The Master Index File is byte addressable, sequential data, containing no imbedded format information. An address value equal to minus one indicates no data exists in the Data File corresponding to that cell. In the case where a Data File entry does not exist, an Index File entry will also not occur.

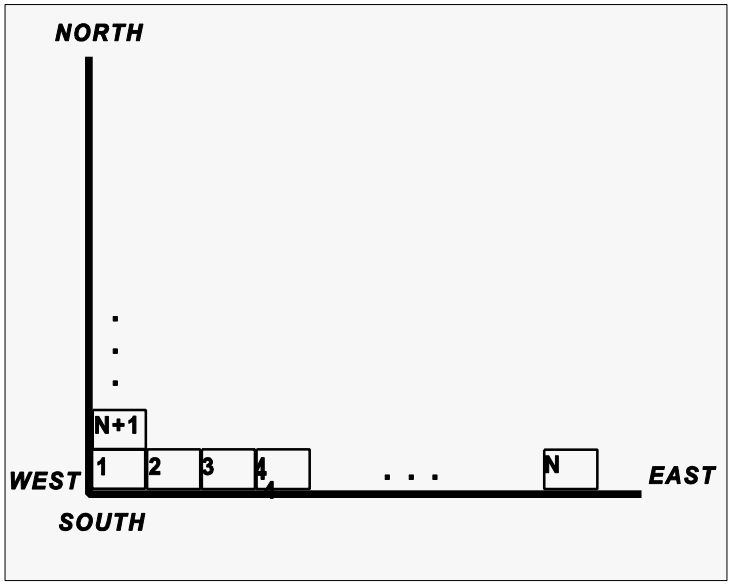

FIGURE 1. Geographic ordering of master index pointers

3.5.3.2 Index file characteristics. The Index File is byte addressable, sequential data, containing no imbedded format information. The Index File contains an unordered entry for every one degree by one degree cell that contains depth data values. An Index File entry would not exist for cells that are completely void at a specific resolution. The file attributes include the associated resolution of the Data File entry, a cell number relating to the ordered entry of the Master Index File, the byte address in the Data File where the depth entries for this one degree cell begins, a record entry number in the Description File for this cell and resolution, the year and Julian day when this cell of data was created or updated, the minimum and maximum depths within this one degree cell, and a bitmap of the coverage within the one degree cell. The bitmap is geographically ordered first by latitude and then by longitude. The Index File provides the linkage to both

the Data File for a specific one degree cell and the associated information in the Description File about that data.

3.5.3.3 Description File characteristics. The Description File provides details on the compression, storage and scaling of the data for a one degree cell of specific resolution. It is linked to the Data File through the byte address and record entry number in the Index File. The Description File contains entries for the resolution, path filename, scale factor, storage method/type and compression scheme of the depth values in the Data File. The Description File entries provide for the design flexibility of DBDB-V by allowing for multiple Data Files, as well as, storage, scaling and compression optimized to the resolution of future grid sizes and depth values. The Description File is byte addressable, sequential data, containing no imbedded format information.

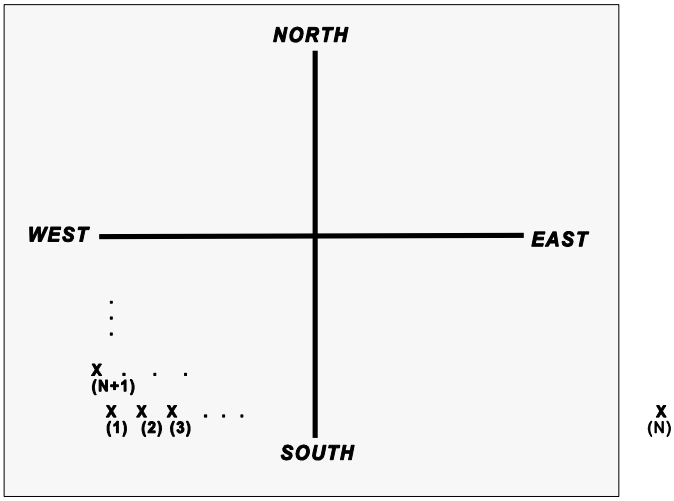

FIGURE 2. Geographic ordering of one degree cell depth values

3.5.3.4 Data File(s) characteristics. The Data File is byte addressable, sequential data, containing no imbedded format information. Each depth value is stored in accordance with the Description File. For the 5, 2, 1 and 0.5 grid resolutions, each depth value is stored as a short integer (2 bytes), unscaled and uncompressed. The depth values are ordered geographically, over the extent of the specific one degree by one degree cell, first by latitude and then by longitude. FIGURE 2 applies. For grid nodes that are void of data (i.e. have not been fully compiled) or represent land, the depth value is replaced by distinct null values. Land node values are represented by a negative ten integer value, and void nodes are represented by the value 32,767. The current version of DBDB-V contains one Data File, however, more than one can be accommodated.

3.5.4 Description of file contents.

3.5.4.1 Master Index file contents. The Master Index File contains [65,160 * (# grid resolutions)] entries of byte addresses. The attributes of the Master Index File are defined in TABLE 2. A byte address equal to a negative one indicates no data exists in the Data File corresponding to that cell.

TABLE 2. Attributes of Master Index File

Attribute Name/ Access Name	Definition	Type/ Size in Bytes/ Units of Measure	Domain
index-file-position indx_pos	The byte address in the Index File where the Index File entries for this one degree cell begins.	long int 4 N/A	indx_ptr IN (≥0,-1) ≥0: address value -1: null indicator for no data

3.5.4.2 Index file contents. The Index File contains an unordered entry for each one degree cell of each resolution that contains depth data. The attribute structure for each entry of the Index File is defined in TABLE 3.

TABLE 3. Attributes of Index File

Attribute Name/ Access Name	Definition	Type/ Size in Bytes/ Units of Measure	Domain
gridded-bathymetry-resolution/igrid	The arc minute grid spacing for the specific one degree cell times 10,000	long int/ 4/ arc minutes	0<igrd≤50000
gridded-bathymetry-location-id cell_num	The cell number in the Master Index File that relates to this one degree cell and resolution.	unsigned short int/ 2/ N/A	0≤cell_num≤65160
data-file-position data_pos	The byte address in the Data File where the Data File entries for this one degree cell begins.	long int/ 4/ N/A	0≤data_pos
description-file-number desc_num	The record entry number in the Description File where the Description File entries for this one degree cell and resolution begins.	unsigned char/ 1/ N/A	0≤desc_num≤255
gridded-bathymetry-date-of-update year	The four digit year, when combined with the julian day, indicates when this one degree cell was created or updated.	short int/ 2/ year	1978≤year
gridded-bathymetry-date-of-update julian_day	The julian day, when combined with the year, indicates when this one degree cell was created or updated.	short int/ 2/ day	1≤julian_day≤366
gridded-bathymetry-minimum-depth min_depth	The minimum gridded depth value, times the scaling factor, within this one degree cell.	short int/ 2/ meters at 1500 m/s	depth IN(0≤depth<32767, -10, 32767) 0≤depth<32767: depth value -10: null indicator for land nodes 32767: null indicator for void nodes
gridded-bathymetry-maximum-depth max_depth	The maximum gridded depth value, times the scaling factor, within this one degree cell.	short int/ 2/ meters at 1500 m/s	depth IN(0≤depth<32767, -10, 32767) 0≤depth<32767: depth value -10: null indicator for land nodes 32767: null indicator for void nodes
gridded-bathymetry-coverage bitmap	A 5 arc minute resolution bitmap of the coverage within this one degree cell. Ordered first by latitude and then by longitude.	unsigned char/ 18/ N/A	bitmap IN(0,1) 0: no valid depths w/in 5 minute subcell 1: valid depths w/in 5 minute sub-cell

3.5.4.3 Description file contents. The Description File contains one or more entries for each unique grid resolution. The attribute structure for each entry of the Description File is defined in TABLE 4.

TABLE 4. Attributes of Description File

Attribute Name/ Access Name	Definition	Type/ Size in Bytes/ Units of Measure	Domain
gridded-bathymetry-resolution igrid	The arc minute grid spacing for the specific one degree cell times 10,000	long int 4 arc minutes	0<igrd≤50000
gridded-bathymetry-filename data_path	The filename, including path, of the Data File associated with this specific one degree cell and resolution.	ASCII char 132 N/A	N/A
gridded-bathymetry-scaling scale_factor	The factor by which the Data File depth values are multiplied by.	short int 2 N/A	1≤scale_factor
gridded-bathymetry-storage storage	The storage method (i.e. type) of the depth values within the Data File for this one degree cell.	unsigned char 1 N/A	storage IN(0,1,2,3,4) 0: short integer 1: long integer 2: unsigned short integer 3: unsigned character 4: ASCII character
gridded-bathymetry-compression-routine compress	The compression routine applied to the Data File for this resolution and one degree cell.	unsigned char 1 N/A	compress IN(0,0>) 0: not compressed >0: some compression routine

3.5.4.4 Data file(s) contents. The Data File(s) address structure for each populated one degree by one degree cell contains [(60/resolution) x (60/resolution)] number of entries of depth values. The attributes of the Data File(s) are defined in TABLE 5. A depth value equal to a negative ten indicates a land grid node. A depth value equal to 32,767 indicates a void grid node.

TABLE 5. Attributes of Data File

Attribute Name/ Access Name	Definition	Type/ Size in Bytes/ Units of Measure	Domain
gridded-bathymetry-depth depth	The gridded depth value times the scaling factor.	short int* 2 meters at 1500 m/s	depth IN(0≤depth<32767, -10, 32767) 0≤depth<32767: depth value -10: null indicator for land nodes 32767: null indicator for void nodes

Note: 5, 2, 1 and 0.5 minute grid values are represented by short integer. Finer resolution grid values may be represented by short integer, long integer or character.

3.5.5 Access software

3.5.5.1 Software applications. The DBDB-V Access software contains a graphical user's interface (GUI) version and a command line version for extracting data of different resolutions from the DBDB-V data base. The command line version is intended for use by system developers to integrate DBDB-V directly into their application software without the GUI. The access software is implemented as a suite of C language software modules and X11/Motif based software modules for the GUI application. This section contains a subsection for each function or capability used in the access software.

3.5.5.1.1 Module build_main.c. The module **build_main.c** contains all the MOTIF routines to build the DBDB-V program interface. It includes the functions **BuildMain**, **QuitCB**, **PositionFormatToggleCB**, **ResolutionCB**, and **BuildHelpMenu**. **QuitCB** is the routine used to exit from the DBDB-V Access program. **PositionFormatToggleCB** is the callback routine for the position format radio box. **ResolutionCB** is the callback for the resolution radio box and **BuildHelpMenu** creates the help menu. This module is not applicable to the command line version of the software.

3.5.5.1.2 Module bx_routines.c. The module **bx_routines.c** contains routines generated by the ICS Builder Xcessory program. This module generates the pixel maps (pixmaps) used on the DBDB-V Access program Access Mode push buttons. This module is not applicable to the command line version of the software.

3.5.5.1.3 Module dbdbv.h. The module **dbdbv.h** is the main header file for the DBDB-V Access program. It contains all the global motif items and global variables used by the DBDB-V Access program.

3.5.5.1.4 Module dbdbv.hlp. The module **dbdbv.hlp** contains all the help messages for the DBDB-V Access program. This module is not applicable to the command line version of the software.

3.5.5.1.5 Module envinon.c. The module **envinon.c** contains the routines **envin**, **envout**, **find_startup** and **get_string**. The routine **envin** reads the user's environment from the .dbdb file in the user's home directory. The routine **envout** writes out the user's environment to the .dbdb file in the

user's's home directory. The routine **find_startup** searches for and opens for read the filename passed to it. The routine **get_string** parses the input string for an equal sign and returns everything to the right of it. This module is not applicable to the command line version of the software.

3.5.5.1.6 Module fixpos.c. The module **fixpos.c** contains the routines **fixpos** and **posfix**. The routine **posfix** converts a character string containing latitude and longitude in various formats to a decimal degrees format. The input formats are either: Hemisphere Degrees Minutes Seconds.decimal, Hemisphere Degrees Minutes.decimal, Hemisphere degrees.decimal, Sign Degrees Minutes Seconds.decimal, Sign Degrees Minutes.decimal, or Sign Degrees.decimal. The routine **fixpos** converts latitude and longitude in decimal degrees back to the input format passed.

3.5.5.1.7 Module get_point.c. The module **getpoint.c** is the routine that extracts a depth value from DBDB-V. Depth values are extracted in a manner that ensures the highest resolution data that is available is used. Depth values that are requested at locations which do not correspond to the data base grid nodes are interpolated using a bicubic spline. It includes the function **free_gp_memory** that frees up memory that has been allocated in the **get_point** routine.

3.5.5.1.8 Module getcell.c. Module **getcell.c** is the routine that extracts depth values from specific one degree by one degree cells.

3.5.5.1.9 Module gtcirc_cbs.c. The module **gtcirc_cbs.c** contains all the callbacks for the great circle path extraction mode. These routines build the great circle path dialogue and performs the depth extractions. It includes the functions **GreatCircleCB**, **GreatCircleExtractCB**, **GreatCircleCloseCB**, **DownTrackToggleCB** and **plot_profile**. **GreatCircleCb** contains the callback for the great circle path push button in the main window. **GreatCircleExtractCB** extracts depths along a great circle path. **GreatCircleCloseCB** extracts the specified point from the data base. **DownTrackToggleCB** sets the downtrack spacing mode of either nautical miles or decimal degrees. The function **plot_profile** plots the depth profile of the extracted data from the great circle path. The command line version of this module is **great_circle.c**.

3.5.5.1.10 Module gtcirc.c. The module **gtcirc.c** is the routine that includes the great circle path algorithm. This routine computes the geographic coordinates of positions along a great circle path given the starting and ending points in decimal degrees and the spacing of the desired output specified in either decimal degrees or nautical miles.

3.5.5.1.11 Module help_cbs.c. The module **help_cbs.c** contains the routines that provide the help function to the user. The routines build the help dialogue and place the appropriate help message into it. It includes the functions **help_setup**, **HelpDialog**, **OnHelpCB**, **OnWindowCB**, **HelpClosedCB** and **ExtractText**. The function **help_setup** sets up the help function for the DBDB-V program. **HelpDialog** creates the pop-up help message. **OnHelpCB** displays the help-onhelp or about-help dialogues. **OnWindowCB** displays the help-index dialogue. **HelpClosedCB** closes the help dialogue and the function **ExtractText** extracts the help text associated with the help index passed to the function. This module is not applicable to the command line version of the software.

3.5.5.1.12 Module logo.c. The module **logo.c** generates the pixel map (pixmap) of the Naval Oceanographic Office logo that is used on the main

interface menu. It includes the function **read_navo_logo** which creates the pixel map (pixmap) and function **get_color** which allocates the appropriate color index for each color in the logo data file. **Logo.h** is a public header file for the **logo.c** routine and **logoP.h** is a private header file for the **logo.c** routine. This module is not applicable to the command line version of the software.

3.5.5.1.13 Module main.c. The module main.c is the main driver routine for the DBDB-V Access program. This routine sets up the other routines and loops for events.

3.5.5.1.14 Module mbr_cbs.c. The module **mbr_cbs.c** contains all the callback routines for the minimum bounding rectangle extraction mode. These routines build the minimum bounding rectangle dialogue and perform the extraction. It includes the functions **MinBoundingRectCB**, **MBRCloseCB**, **MBRExtractCB**, **FormatToggleCB**, **write_header**, **write_data**, **ExposeDensityCB**, **clear_window**, **scale_data**, and **plot_density**. The function **MinBoundingRectCB** is the callback for the minimum bounding rectangle push button in the main window. The function **MBRCloseCB** extracts the specified point from the data base. The function **MBRExtractCB** extracts depths within a minimum bounding rectangle. The function **FormatToggleCB** sets the output write mode to ASCII or binary. The functions **write_header** and **write_data** write out the header and data information, respectively, according to the output mode setting. The function **ExposeDensityCB** repaints the density plot after an expose event. The function **clear_window** clears the density drawing area. The function **scale_data** scales each data point to fit within the data density plot. The function **plot_density** plots the data density plot. The command line version of this module is **mbr.c**.

3.5.5.1.15 Module msg_dialogs.c. The module **msg_dialogs.c** contains routines used by DBDB-V to create message boxes. It contains the functions **ErrorDialog**, **InfoDialog**, **WarningDialog**, **WorkingDialog** and **DialogClosingCB**. The function **ErrorDialog** creates and displays an error message dialogue. The function **InfoDialog** creates and displays an information message dialogue. The functions **WarningDialog** and **WorkingDialog** create and display warning message and working message dialogues respectively. The function **DialogCloseCB** destroys the message dialogue. This module is not applicable to the command line version of the software.

3.5.5.1.16 Module nr.h. The module **nr.h** is a header file for the module **get_point.c** that contains function prototypes.

3.5.5.1.17 Module nrutil.c. The module **nrutil.c** contains the routines that allocate memory for different types (e.g. float, int, char, etc) of one and two dimensional arrays. It also contains routines to free the allocated memory.

3.5.5.1.18 Module nrutil.h. The module **nrutil.h** is a header file that contains function prototypes for the routines in the module **nrutil.c**.

3.5.5.1.19 Module open_v.c. The module **open_v.c** is a routine that opens all the DBDB-V files except for the data file(s). It also outputs a list of each unique grid resolution that is present in DBDB-V.

3.5.5.1.20 Module pixmaps.h. The module **pixmaps.h** contains the data used by the Builder Xcessory routines to build the pixel maps (pixmaps) used on the Access Mode push buttons. This module is not applicable to the command

line version of the software.

3.5.5.1.21 Module point_cbs.c. The module **point_cbs.c** contains all the functions for the point extraction mode. These routines build the point dialogue and perform the requested extraction. It contains the functions **PointCB**, **PointExtractCB** and **PointCloseCB**. The function **PointCB** contains the callbacks for the point extraction button in the main window. **PointExtractCB** extracts the specified depth point from the data base. The function **PointCloseCB** closes the point extraction dialogue. The command line version of this module is **point.c**.

3.5.5.1.22 Module spline.c. The module **spline.c** is the routine which, in combination with **splint.c**, generates interpolated depth values based on a cubic spline interpolation algorithm. The routine **spline.c** returns the second derivatives of the interpolating function for use in **splint.c**. This routine is taken from *Numerical Recipes in C* (reference (d)).

3.5.5.1.23 Module splint.c. The module **splint.c** is the routine which, in combination with **spline.c**, generates interpolated depth values based on a cubic spline interpolation algorithm. This routine allows for the extraction of depth values at resolutions that are off the gridded depth value nodes. This routine is taken from *Numerical Recipes in C* (reference (d)).

3.5.5.1.24 Module swap.c. The module **swap.c** contains routines used for byte swapping. It includes the functions **swap_float**, **swap_int** and **swap_long** which swap bytes in a 4 byte float, 2 byte integer and 4 byte long integer respectively.

3.5.5.1.25 Module text_cbs.c. The module **text_cbs.c** contains utility routines used in handling the behavior of text field widgets. It includes the functions **TextFocusCB** and **TextLosingFocusCB**. **TextFocusCB** is the callback for highlighting selected text fields. **TextLosingFocusCB** is the callback for de-highlighting text fields. This module is not applicable to the command line version of the software.

3.5.5.1.26 Module utilities.c. The module **utilities.c** contains general utility functions used by the DBDB-V Access program. It contains the functions **ForceUpdate**, **CheckForVisibility** and **bubble**. The function **ForceUpdate** checks to ensure a windows's contents are visible. The function **CheckForVisibility** checks for visibility events in the events queue and processes them. The function **bubble** sorts float vectors in descending order using the bubble sort algorithm.

3.5.5.1.27 Module vdef.h. The module **vdef.h** is a header file that defines variables for use with DBDB-V.

3.5.5.1.28 Module change_utility/change.c. The module **change.c** opens and reads all DBDB-V data base filenames, including path, and provides the user with the option to change the filenames. When a filename change is requested, the Description File is searched to change all occurrences of the old filename(s) to the new filename(s).

3.5.5.1.29 Module plot_utils/xy.c. The module **xy.c** is a routine that contains general purpose plot widget functions. Adapted from the Fermilab Nirvana GUI library. This module is not applicable to the command line version of the software.

3.5.5.1.30 Module plot_utils/drawAxes.c. The module **drawAxes.c** is a routine that contains generic axis drawing functions for two dimensional plots and graphs. Adapted from the Fermilab Nirvana GUI Library.

3.5.5.2 Software Tools. The OAML Data Base Description Document for DBDB-V (see 2.1.1) should be referred to for system installation and operation requirements, software notes for system and software developers, and operating instructions.

3.6 Security.

3.6.1 Security Classification. This Specification is UNCLASSIFIED. DBDB-V is UNCLASSIFIED; approved for public release; distribution is unlimited.

3.7 CD ROM labeling and packaging. CD ROM labeling, and labeling on the cardboard sleeve, or jewel case liner/information booklet, as applicable, shall be in accordance with the contract. Method of packaging (cardboard sleeve or jewel case) shall be as specified in the contract (see 5.1). References to figures below are applicable to the DBDB-V available for unlimited distribution/public sale.

3.7.1 Product specific items. The following is a list of “variable by product” items shown on CD-ROM labeling and packaging, and the relevant information specific to DBDB-V.

a. Product Description: Digital Bathymetric Data Base - Variable Resolution (DBDB-V™)

b. Series: DBDB-V

c. NIMA reference number format is DBDBVnnn00, where nnn represents the three digit DBDB-V CD number.

d. Copyright note: (year of production inserted)

©Copyright (add year) by the U.S. Government. No copyright claimed under title 17, U.S.C. Intellectual property rights on data may be subject to claims by other nations. Users intending to exploit and distribute data further should contact the appropriate U.S. or non-U.S. hydrographic authority with respect to such claims and U.S. copyright.

e. NIMA Reference Number: First five digits are “DBDBV” and last three digits are three digit CD number, i.e., “016”.

3.7.2 Volume identifier. This should be identical to the eleven characters of the Volume Identifier (first eleven characters of the ISO 9660 Volume Identifier (32 characters available)) written on the header of the disk (see MIL-HDBK-9660).

3.7.3 Information booklet. Information booklets shall be provided for each DBDB-V CD. Labeling of the DBDB-V information booklet covers shall be in accordance with the contract. When used in conjunction with the jewel case, the front cover of the information booklet also serves as the front cover of the case.

3.7.3.1 Introductory statement. All DBDB-V information booklets show the following standard introductory statement.

Introduction
DBDB-V is a digital bathymetric data base that provides ocean depths at various gridded resolutions. DBDB-V was developed by NAVOCEANO to support the generation of bathymetric chart products, and to provide bathymetric data to be integrated with other geophysical and environmental parameters for ocean modeling. DBDB-V is a combination of different resolution gridded bathymetric data bases. The depth posts, or grid nodes, are defined by the intersections of rows and columns within a matrix. The matrix intervals, or grid post spacing, defined in terms of geographic arc minutes will be 0.5, 1, 2 and 5 minutes for Version 1.0 of DBDB-V.

This DBDB-V was produced under DoD Specification MIL-PRF-32030, (27 May 1998).

3.7.3.2 Source Information Source information shall be shown as illustrated in the following example:

The coarser resolution data grids (1, 2 and 5 arc minute grids) are constructed by digitizing bathymetric contours of hard copy charts. The digitization rate and nominal chart scales are 21 measurements per inch of contour at a nominal chart scale of 1:1000000 for the 1 minute grid, 21 measurements per inch of contour at a nominal chart scale of 1:1000000 for the 2 minute grid, and 10 measurements per inch of contour at a nominal chart scale of 1:4000000 for the 5 minute grid. These digitally rendered contours are then put through a gridding routine developed by the Naval Oceanographic Office. This routine takes the values that fall within a grid node area of influence and utilizing a multi-stage minimum-curvature spline algorithm, interpolates the values to derive a single representative depth value for each grid node (1, 2 or 5 arc minute grid node spacing).

The finer resolution data grid (0.5 arc minute grid) is generated in two distinct manners:

a. Hard copy charts have contour digitization performed at a rate of 21 measurements per inch of contour and at a nominal chart scale of 1:500000. The digitized contours and/or digital source data are input to a gridding routine developed by the Naval Oceanographic Office. This routine takes the values that fall within a grid node area of influence and, utilizing a multi-stage minimum-curvature spline algorithm, interpolates the values to derive a single representative depth value for each grid node (0.5 arc minute spacing), or

b. It can be derived directly from higher resolution bathymetric data grids by application of computer algorithms.

Upon completion of the bathymetric grid it is matched to the World Vector Shoreline, or higher resolution shorelines, and discrepancies are resolved. A land mask is constructed, for that portion of the grid over land, filled with null values.

3.7.3.3 User's Note All DBDB-V information booklets show the following standard user's note.

USERS WITH QUESTIONS, CORRECTIONS, ADDITIONS, OR COMMENTS ABOUT THIS OR OTHER NIMA PRODUCTS OR SERVICES, PLEASE TELEPHONE THE NIMA CUSTOMER HELP DESK: 1-800-455-0899, COMMERCIAL 314-260-1236, OR DSN 490-1236, OR WRITE: NIMA CUSTOMER SUPPORT/COD, 12310 SUNRISE VALLEY DRIVE, RESTON, VA 20191-3449.

3.7.3.4 Jewel case liner (back cover of case). Labeling of the DBDB-Vjewel case liner shall be in accordance with the contract.

3.7.4 Cardboard sleeve mailer. If a cardboard mailing sleeve is specified in the contract, it shall be labeled in accordance with DMA PI 813-101, Figure 10.

3.8 Marking. In addition to any special markings required by the contract or order, markings shall be in accordance with requirements of MIL-STD-129 for military levels of protection.

3.9 Bar code markings. Bar code markings are required and shall be applied in accordance to MIL-STD-600010.

4. QUALITY ASSURANCE

4.1 Classification of inspection. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.2).

b. Quality conformance inspection (see 4.3).

4.2 First article inspection. When a first article inspection is required (see 3.1 and 6.3), it shall be examined for defects specified in 4.4.1 and tested as specified in 4.4.2.

4.3 Quality conformance inspection. Quality conformance inspection shall include the examination on 4.3.1 and the test on 4.3.2.

4.3.1 Examination. The database shall be examined for compliance with the requirements specified in section 3. Unless a waiver has been granted non compliance with any of the specified requirements shall constitute cause for rejection.

4.3.2 Tests. A sample determined by the contracting officer shall be read back after generation to ensure all files have been properly transferred.

4.4 Government furnished material. The contractor shall not duplicate, copy, or otherwise reproduce the MC&G property for purposes other than those necessary for performance of the contract.

4.5 Government property surplus. At the completion of performance of the contract, the contractor, as directed by the contracting officer, shall either destroy or return to the Government all government furnished MC&G property not consumed in the performance of the contract.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. DBDB-V is a digital bathymetric data base that provides ocean depths at various gridded resolutions. DBDB-V was developed by NAVOCEANO to support the next generation of bathymetric chart products, and to provide bathymetric data to be integrated with other geophysical and environmental parameters for ocean modeling. DBDB-V is a combination of different resolution gridded bathymetric data bases. The depth posts, or grid nodes, are defined by the intersections of rows and columns within a matrix. The matrix intervals, or grid post spacing, defined in terms of geographic arc minutes will be 0.5, 1, 2 and 5 minutes for Version 1.0 of DBDB-V.

6.1.1 DBDB-V generation. DBDB-V is developed by the Naval Oceanographic Office and combines in one data base structure different resolutions of gridded bathymetric data bases. The coarser resolution data grids (1, 2 and 5 arc minute grids) are constructed by digitizing bathymetric contours of hard copy charts. The digitization rate and nominal chart scales are 21 measurements per inch of contour at a nominal chart scale of 1:1000000 for the 1 minute grid, 21 measurements per inch of contour at a nominal chart scale of 1:1000000 for the 2 minute grid, and 10 measurements per inch of contour at a nominal chart scale of 1:4000000 for the 5 minute grid. These digitally rendered contours are then put through a gridding routine developed by the Naval Oceanographic Office. This routine takes the values that fall within a grid node area of influence and utilizing a multi-stage minimum-curvature spline algorithm, interpolates the values to derive a single representative depth value for each grid node (1, 2 or 5 arc minute grid node spacing). The finer resolution data grid (0.5 arc minute grid) is generated in two distinct manners:

a. Hard copy charts have contour digitization performed at a rate of 21 measurements per inch of contour and at a nominal chart scale of 1:500000. The digitized contours and/or digital source data are input to a gridding routine developed by the Naval Oceanographic Office. This routine takes the values that fall within a grid node area of influence and, utilizing a multi-stage minimum-curvature spline algorithm, interpolates the values to derive a single representative depth value for each grid node (0.5 arc minute spacing), or

b. It can be derived directly from higher resolution bathymetric data grids by application of computer algorithms.

Upon completion of the bathymetric grid it is matched to the World Vector

Shoreline, or higher resolution shorelines, and discrepancies are resolved. A land mask is constructed, for that portion of the grid over land, filled with null values.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification.

b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2.1 and 2.3).

c. When a first article is required (see 3.1, 4.3, and 6.3).

d. Levels of preservation and packaging (see 3.7).

6.3 First article. When a first article is required, it will be inspected and approved under appropriate provisions of FAR 52.209. The first article will be a preproduction sample. The contracting officer will specify the appropriate type of first article and the number of units to be furnished. The contracting officer will also include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.4 Definitions.

6.4.1 Accuracy. The degree of conformity with which horizontal position and vertical values are represented on a map, chart, or related product in relation to an established standard.

a. Horizontal accuracy, absolute. The uncertainty in horizontal position of a point with respect to the World Geodetic System caused by random and uncorrected systematic errors. The value expressed as a circular error at the 90% confidence level.

b. Vertical accuracy, absolute. The uncertainty in the height of a point with respect to Mean Sea Level caused by random and systematic errors. The value expressed as a linear error at the 90% confidence level.

6.4.2 Cell. One degree latitude by one degree longitude area of coverage.

6.4.3 Circular error. An accuracy figure representing the stated percentage of probability that any point expressed as a function of two linear components (for example, latitude and longitude or northing and easting) will be within the given figure.

6.4.4 Digital Bathymetric Data Base (DBDB). A geographic matrix of depth values converted into a numerical format for computer storage and analysis at precise increments of latitude and longitude.

6.4.5 Depth matrix. A rectangular array of depth values.

6.4.6 Linear error. The difference between the true or known value and the measured or derived value, and is normally expressed in terms of a percentage probability level. LE 90% is the term used to express the linear error at 90% probability, the Map Accuracy Standard. This refers to the

vertical accuracy of depth data in the digital data base.

6.4.7 Mean sea level. The average height of the surface of the sea for all stages of the tide, used as a reference for elevations.

6.4.8 Nautical mile. 6076 feet; 1852 meters (international value).

6.4.9 World Geodetic System (WGS). A consistent set of parameters describing the size and shape of the Earth, the positions of a network with respect to the center of mass of the Earth, transformations from major geodetic datums, and the potential of the earth (usually in terms of harmonic coefficients).

6.5 International Standardization Agreements. This section is not applicable to this specification.

6.6 Subject term (key word) listing.

gridding
ocean depths
ocean floor
seafloor

6.7 NIMA Customer Help Desk. For questions concerning this or other NIMA products, services, or specifications, please telephone the NIMA Customer Help Desk at 1-800-455-0899, Commercial 314-260-1236, or DSN 490-1236

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Preparing Activity: NIMA - MP

(Project MCGT-0332)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copes of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	**1. DOCUMENT NUMBER** **MIL-PRF-32030**	**2. DOCUMENT DATE** *(YYMMDD)* 27 May 1998

3. **DOCUMENT TITLE**
Digital Bathymetric Data Base - Variable Resolution (DBDB - V)

4. **NATURE OF CHANGE** (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER		
a. NAME *(Last, First, Middle Initial)*	b. ORGANIZATION	
c. ADDRESS *(Include Zip Code)*	d. TELEPHONE *(Include Area Code)* (1) Commercial (2) *AUTOVON* *(If applicable)*	**7. DATE SUBMITTED** *(YYMMDD)*

8. PREPARING ACTIVITY		
a. NAME National Imagery and Mapping Agency	b. TELEPHONE *(Include Area Code)* (1) Commercial (703) 264-3106	 (2) AUTOVON 570-3106
c. ADDRESS *(Include ZIP Code)* National Imagery and Mapping Agency ATTN: Customer Support /COD, Mail Stop P-38 12310 Sunrise Valley Drive Reston, VA 20191-3449	**IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:** DLSC-LM 8725 John J. Kingman Road, Suite 2533 Fort Belvoir, VA 22060-6879	