

METRIC

MIL-W-89012

27 July 1990

SUPERSEDING

PS/2GC/030

May 1988

MILITARY SPECIFICATION

WORLD VECTOR SHORELINE

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

1. SCOPE

1.1 Scope. This specification defines the format, content, related product design and details necessary for the production of the World Vector Shoreline (WVS). The WVS is a digital data file containing the shorelines, international boundaries and country names of the world. These geographic features are required for many of the digital data bases being used to support geographic information systems and weapons systems. The WVS is a standard DMA product that has been designed for use in many different applications. Users of this product may convert the WVS data to system specific formats.

1.2 Purpose. The purpose of this specification is to assure uniformity of treatment among all mapping and charting elements engaged in a coordinated production and maintenance program for this product.

1.3 Security.

1.3.1 Security classification. The security classification of the products generated by the use of these specifications will be the lowest category practicable. When it is necessary to assign a security classification to the product, it will be accomplished in accordance with established national security procedures.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Director, Defense Mapping Agency, ATTN: PR, 8613 Lee Highway, Fairfax, VA 22031-2137 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

DISTRIBUTION STATEMENT A. Approved for public release;
distribution unlimited.

Enclosure

MIL-W-89012

1.3.2 Product classification. These Product Specifications and their resultant products are UNCLASSIFIED.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. This section is not applicable to this specification.

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

U.S. Department of State "Guide to International Boundaries" 800231 (545037) 6-86, or latest edition.

(Copies of this publication are available from The Office of The Geographer, Room 8742, Department of State, Washington, D.C. 20520.)

Federal Information Processing Standards (FIPS) Publications 3-1, 10-3, 25, and 50.

(Copies of this publication are available from the U.S. Army Publication Center, 2800 Eastern Ave., Baltimore, MD 21224.)

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

2.3 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 MS 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 Accuracy. The World Vector Shoreline is a generic data set for medium scale display of world shoreline, boundary and country names data, and requires the following accuracies:

3.1.1 Horizontal accuracy. The absolute horizontal accuracy requirement for WVS data is that 90% of all identifiable shoreline features be located within 500 meters (2.0mm at 1:250,000 scale) circular error of their true geographic positions with respect to the preferred datum (WGS). Absolute horizontal accuracy is the uncertainty of a position with respect to the horizontal datum required by the product specification, expressed in circular error (90% probability) terminology.

3.1.2 Vertical accuracy. There is no elevation data in the World Vector Shoreline product, therefore vertical accuracy is not applicable.

MIL-W-89012

3.1.3 Country name accuracy. All country names in the World Vector Shoreline data set shall be those approved by the United States Board of Geographic Names (BGN), with the exception of those country names over 20 characters long, which shall be abbreviated as shown in Appendix C of this specification. International boundary information shall be in accordance with U.S. Department of State requirements as specified in "Guide to International Boundaries" 800231 (545037) 6-86, or latest edition.

3.2 Datum. Boundaries and Mean High Water shorelines in the World Vector Shoreline data set shall be referenced to the World Geodetic System (WGS) Datum and Ellipsoid. The vertical datum for shoreline features shall preferably be Mean High Water, but because of the small scale involved, shoreline features not adjusted to Mean High Water shall be used if no source on Mean High Water is available.

3.3 Product Format.

3.3.1 General. The WVS format makes use of a "chain-node" data structure to minimize redundant data storage. To eliminate overlaps or gaps between segments of adjacent features, each point of intersection is explicitly defined. These points are called nodes. Since a sequence of segments may outline more than one feature, features are cross-referenced to their segments (and vice versa) via unique alphanumeric feature and segment keys. By this means, a segment that is shared by multiple features is stored only once and is pointed to by the feature it comprises. One feature may be comprised of many segments, or one segment may comprise several features, but in either case, each segment and each feature is stored only once (see Appendix A). Given this storage method, the order of vertices within a segment defines a direction, allowing the identification of the areas to the left and to the right of a segment (see Appendix D). For example, the left side of a boundary segment will be one country, and the right side of the segment will be another country. For shoreline segments, one side will be identified with a country, while the other side will be identified as water.

3.3.2 Physical characteristics of magnetic tape. WVS magnetic tapes shall be coded in ASCII format, with a physical record size of 48 bytes. Blocks shall consist of 200 records, for a total block size of 9600 bytes. Normally, magnetic tapes shall be recorded at a density of 6250 characters per inch (CPI) and shall conform with the Federal Information Processing Standards Publication 50 (FIPS PUB 50). Upon user request, magnetic tapes can be recorded at a density of 800 or 1600 CPI, and shall conform with Federal Information Processing Standards Publications 3-1 (FIPS PUB 3-1) for 800 CPI, or Publication 25 (FIPS PUB 25) for 1600 CPI.

3.3.3 Type of input/output. The individual records shall contain no system dependent generated control words.

MIL-W-89012

3.3.4 File description. For production and distribution purposes, the World Vector Shoreline is divided into ten ocean basin area files (see Figure 1). Together, the ten files form a seamless world, with the exception of Central America, where there is an area of overlap between the Western North Atlantic File and the Eastern North Pacific File. The Ocean Basin Area Files described below only apply to the WVS product. The names and limits of these areas do not correspond to International Hydrographic Organization (IHO) Special Publication No. 23, Limits of Oceans and Seas. WVS files are defined as follows:

a. 0 - Southern Ocean - The area south of 60°S.

b. 1 - Eastern North Atlantic - The area bounded by a line joining:

80°N, 030°W;
80°N, 100°E;
35°N, 100°E;
35°N, 042°E;
25°N, 042°E;
25°N, 030°W;
80°N, 030°W.

c. 2 - Indian Ocean - The area bounded by a line joining:

25°N, 020°E;
25°N, 042°E;
35°N, 042°E;
35°N, 100°E;
0°, 100°E;
0°, 130°E;
60°S, 130°E;
60°S, 020°E;
25°N, 020°E.

d. 3 - Western North Pacific - The area bounded by a line joining:

80°N, 100°E;
80°N, 170°W;
0°, 170°W;
0°, 100°E;
80°N, 100°E.

e. 4 - Eastern North Pacific - The area bounded by a line joining:

80°N, 170°W;
80°N, 140°W;
65°N, 140°W;
65°N, 110°W;
40°N, 110°W;
0°, 060°W;
0°, 170°W;
80°N, 170°W.

MIL-W-89012

f. 5 - South Pacific - The area bounded by a line joining:

0°, 130°E;
 0°, 070°W;
 60°S, 070°W;
 60°S, 130°E;
 0°, 130°E.

g. 6 - Western North Atlantic - The area bounded by a line joining:

50°N, 110°W;
 50°N, 075°W;
 80°N, 075°W;
 80°N, 030°W;
 0°, 030°W;
 0°, 080°W;
 25°N, 110°W;
 50°N, 110°W.

h. 7 - Eastern South Atlantic - The area bounded by a line joining:

25°N, 030°W;
 25°N, 020°E;
 60°S, 020°E;
 60°S, 030°W;
 25°N, 030°W.

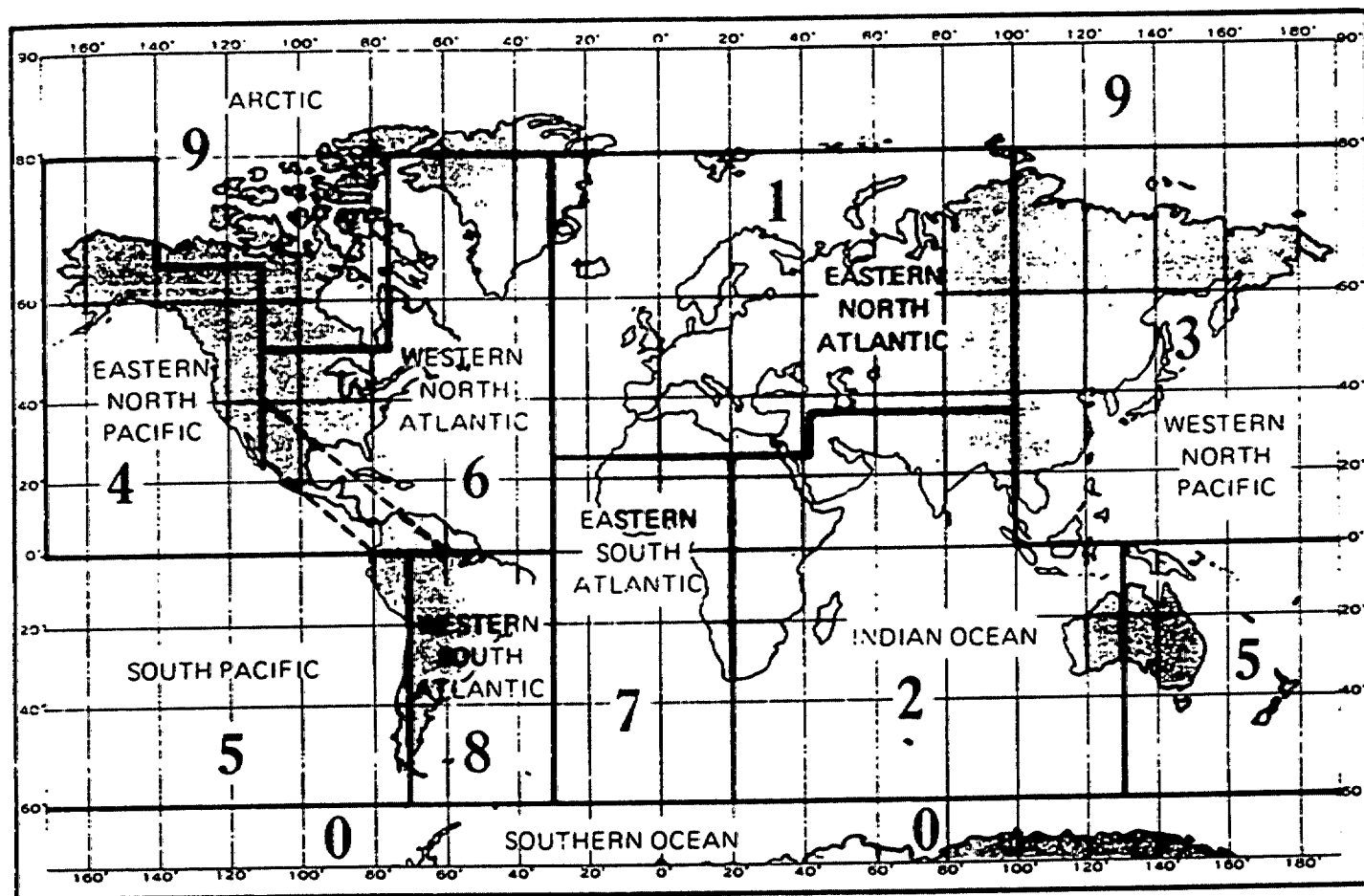
i. 8 - Western South Atlantic - The area bounded by a line joining:

0°, 070°W;
 0°, 030°W;
 60°S, 030°W;
 60°S, 070°W;
 0°, 070°W.

j. 9 - Arctic - The area north of a line connecting:

80°N, 140°W;
 65°N, 140°W;
 65°N, 110°W;
 50°N, 110°W;
 50°N, 075°W;
 80°N, 075°W; thence eastward to
 80°N, 140°W.

MIL-W-89012

FIGURE 1. WVS File Boundaries.

MIL-W-89012

3.3.5 File organization. The overall file organization is depicted below. Each record is 48 bytes long. A file header (4 records or 192 bytes long) starts each WVS file. Explanatory text records, if needed, follow the file header (the number of text records is given by the file header's NTEXT field). The rest of the file consists of data cells, each of which contains all features and segments for a given one degree square area on the earth surface.

```

FILE HEADER1
FILE HEADER2
FILE HEADER3
FILE HEADER4

TEXT RECORD1
.
TEXT RECORDn

CELL #1: HEADER record
        FEATURE records
        SEGMENT records

CELL #2: HEADER record
        FEATURE records
        SEGMENT records

CELL #3: HEADER record
        FEATURE records
        SEGMENT records

CELL #n: HEADER record
        FEATURE records
        SEGMENT records

```

3.3.6 Cell description. Each WVS file is divided into one degree by one degree cells, thus the world is divided into 64,800 cells. WVS data are collected into cells to facilitate windowing, repartitioning, and future expansions of the data set. Each cell is numbered in accordance with the latitude and longitude of its southwest corner. Cells are numbered starting at 90 degrees South latitude/180 degrees longitude and extend eastward from Cell # 1 to Cell # 360. The next row of cells starts at 89 degrees South latitude and extends eastward from Cell # 361 to Cell # 720. This sequence continues northward until the last row of cells, at 89. North latitude are numbered (cell #64441 to cell #64800). See Figure 2.

MIL-W-89012

# 64800	# 64441	# 64442	# 64443	# 64444	...
.
.
.
# 720	# 361	# 362	# 363	# 364	...
# 360	# 1	# 2	# 3	# 4	...
179°E	180°	179°W	178°W	177°W	176°W

FIGURE 2. Example of WVS Cell Numbering.

3.3.7 Feature description. The WVS consists of shorelines, international boundaries/lines of separation, and names data.

a. The shoreline data are produced from cartographic or imagery source material and should not be displayed or plotted at a scale larger than 1:250,000.

b. International boundary data are primarily extracted from small scale cartographic sources and do not show the same level of detail that is shown for shoreline data.

(1) Each side of an international boundary is tagged with an appropriate country code. Country codes are associated with either the left side or the right side of the boundary line as defined by the direction of digitization. In a similar manner, the land side of the shoreline is tagged with the country code and the water side is tagged with a special two-digit code as follows: The first digit is the file number (see 3.3.4). The second digit is a code for the continental or island landmass associated with the shoreline (for WVS database Edition One only). All landmasses that are not the mainlands of the seven continents are considered islands.

MIL-W-89012

The continent codes are:

Asia -A
 Africa - F
 North America - N
 South America - S
 Antarctic Continent - T
 Australian Continent - U
 Europe - E
 Island - I

(2) Country codes are based on the two letter Federal Information Processing Standard coding scheme contained in FIPS Pub 10-3. See Appendix C.

c. Country names, as opposed to country codes, shall be the "short form" approved by the United States Board on Geographic Names (BGN), with the exception that those country names that exceed twenty characters in length shall be compressed as listed in Appendix C. The ability to display or plot a country name within the boundary lines of that country is dependent upon the display scale and hardware characteristics of the individual application. The approximate center of the polygon formed by a country's boundary lines (and shoreline, if any) within a WVS file is included as a potential location for the display of the country name. The approximate center values apply only to that part of the country located within a WVS file's coverage. This set of feature records will be part of the data cell which includes the approximate center values. The approximate center is determined through visual estimation and is not mathematically calculated.

3.3.8 Feature coordinates. All coordinates are decimal values ordered first by the longitude component, and then by the latitude component, to align with the Cartesian system's standard (X,Y) ordering. (Note - This ordering method is opposite to the more traditional method of cartographic positioning, which uses latitude-longitude ordering.)

a. Header record coordinates (in both File and Cell Headers) have an implied decimal point at 0.0001 (or the reciprocal of ORIGDEC, given in File Header #1). An implied "+" indicates east or north and an encoded "-" indicates west or south, following the International Standard (#6709-1983). 180 degrees longitude is always listed as -180 in the WVS data set. Thus, a header record coordinate (0365000,-750000) refers to 36.5 degrees East, 75 degrees South.

b. In data records, however, coordinates (XSECONDS,YSECONDS) are given in positive 0.1 seconds (or /DATADEC, given in File Header #1) of offset from the cell origin. The cell origin (LNGCELL,LATCELL) is the southwest corner of a cell. For example, given the YSECONDS data value 003480 in a LATCELL of -750000 with a DATADEC value of 10, the full latitude is computed as follows:

MIL-W-89012

latitude degrees = (LATCELL / ORIGDEC) deg +
 [(YSECONDS / DATADEC) sec / 3600 sec/deg]

= (-750000 / 10000) deg + [(3480 / 10) / 3600] deg
 = -75.0000 deg + 0.09667 deg
 = -74.90333 degrees, or
 74 deg 54 min 12.0 sec South

3.3.9 File structure.

a. File header records. See Appendix B for a sample WVS file listing.

(1) File Header #1: Title, source and coordinate conversions.

Name	Format	Description
TITLE	A20	Title of the file (Names are recorded without spaces)
FILENUM	I	File number (refer to Figure 1)
EDITION	I2,1X	Edition number
PRODUCER	A8,1X	USDMAHTC
COMPDATE	I4,1X	compilation date (YYMM) of this data set
ORIGDEC	I5	inverse of implied decimal for LNG,LAT origin points given in file and cell headers. If ORIGDEC = 10,000, divide LNG and LAT origins by 10,000.
DATADEC	I5	Inverse of implied decimal for LNG,LAT data points in segment records. If DATADEC= 10, divide LNG and LAT data points by 10.

(2) File Header #2: Geographic boundaries of file.

Note - This file header is included for the use of future digital products which may use the WVS format.

Name	Format	Description
LNGOR	I8	Longitude of global file origin, from which all cell numbering begins (global origin = -180).*
LATOR	I7	Latitude of global file origin, from which cell numbering begins (global origin = -90).*
XMAP	I3	Width of file in degrees longitude (full world = 360).*
LNGSW	I8	Longitude of southwest file corner.*
LATSW	I7	Latitude of southwest file corner.*
LNGNE	I8	Longitude of northeast file corner.*
LATNE	I7	Latitude of northeast file corner.*

MIL-W-89012

For WVS Edition One:

LNGOR = -1800000
 LATOR = -900000
 XMAP = 360
 LNGSW = -1800000
 LATSW = -900000
 LNGNE = -1800000
 LATNE = -600000

* Coordinates measured in degrees from origin; divide by ORIGDEC.

(3) File Header #3: Feature counts.

Name	Format	Description
NFEA	I7,1X	Total number. of features in file.
NPOINTS	I7,1X	Number of point features.
NLINES	I7,1X	Number of line features.
NAREAS	I7,1X	Number of area features.
NCODES	I4,1X	Number of different FACS codes in file (e.g. feature types).
MSEGperFEA	I3,1X	Maximum number of segments comprising a feature.
MFEAperSEG	I2	Maximum number of features depicted by a segment.
BLANK	5X	

(4) File Header #4: Segment, cell and text record counts.

Name	Format	Description
NSEG	I7,1X	Total number of segments in file.
MVRTperSEG	I5,1X	Maximum number of vertices in a segment.
ISCALE	I9,1X	Scale reciprocal (e.g. 250000 = 1:250,000).
XCELL	I4,1X	Width (X) of cells in degrees of LNG. (Implied decimal = 0.1). 0010 for WVS Edition One.
YCELL	I4,1X	Height (Y) of cells in degrees of LAT. (Implied decimal = 0.1). 0010 for WVS Edition One.
NCELLS	I6,1X	Number of cells in the file.
Name	Format	Description
NTEXT	I4	Number of text records to follow.
BLANK	3X	

(5) Text Records: Format = A48. The number of text records is NTEXT.

MIL-W-89012

b. Data cell records. Each of the cells contained in the file is represented by a header. If a cell is not empty (NSEGINCELL > 0), the header is followed by the cell's feature records, which are followed by a series of segment records. The formats of the cell header, feature records, and segment records follow.

(1) Cell header record. Each data cell starts with a one-record header containing a cell identification number, the cell origin (longitude and latitude of the lower left corner of the cell), the number of features and segments in the cell, and the number of 48-byte feature and segment records the cell contains. Headers for empty cells are included for algorithmic simplicity and future data enhancements. The feature and segment record counts provided in the header can be used to skip directly to the cell's segment data for simple graphic applications, or to skip over one cell to the next cell.

Name	Format	Description
CELLFLAG	A1	New cell marker = "C".
CELLTYPE	A1	Key to cell contents: "L" = all land, "W" = all water, "C" = combination.
NCELLHEAD	I1	Number of additional cell header records that immediately follow this one (for WVS Edition One, NCELLHEAD= 0).
CELLNUM	I6	Cell number (1 - 64800)
LNGCELL	I8	Longitude of southwest cell corner* (range from -1800000 to 1790000).
LATCELL	I7	Latitude of southwest cell corner* (range from -900000 to 890000).
NFEAinCELL	I5	Number of features in cell.
NSEGINCELL	I5	Number of segments in cell.
NFEAREC	I7	Number of 48-byte feature records in cell. Feature header records, extra data records, and feature data records are the possible feature records.
NSEGREC	I7	Number of 48-byte segment records in cell NFEAREC + NSEGREC + NCELLHEAD = number of records preceding the next cell. Segment header records, extra feature reference records, and segment data records are the possible segment records.

* Cell origins measured in degrees; divide by ORIGDEC (in File Header #1).

(2) Cell feature records. Each cell contains a certain number of features, equal to the NFEAinCELL value. Each feature has a header record, an extra attribute record, if required by the type of feature, and data records.

MIL-W-89012

(a) Feature header records: Each feature has at least one feature header record to identify the feature and its associated attributes, segment records, and (feature) data records.

Name	Format	Description
FEAFLAG	A3	New feature marker = "FEA" (constant).
FEANUM	I7	Unique feature identification number (unique in current cell) used to key from segment records.
FEATYPE	A1	"P" is point, "L" is line, and "A" is area feature (WVS Edition One has only point features for names and only line features for shorelines and boundaries).
FACS	A5	Code indicating FACS feature type (see 3.4).
ATTRIB	A24	Attribute buffer; format based on feature type.

The following format is used for Shorelines and Boundaries:

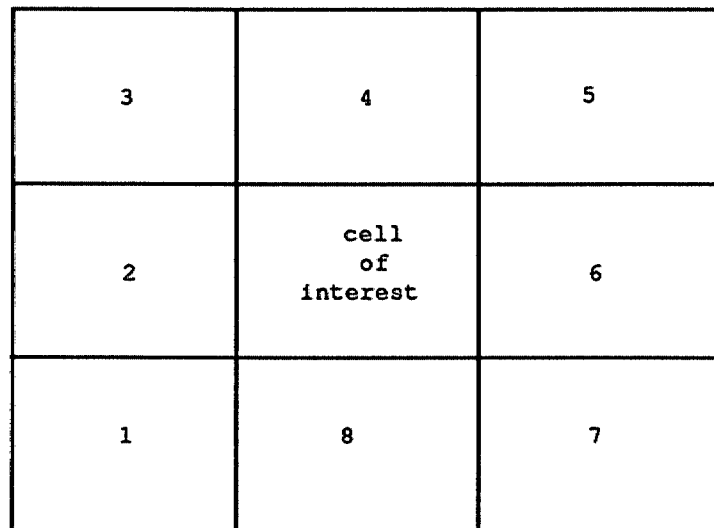
ATTVAL	3A6	Up to three attributes, each with a three letter attribute code and three digit value code.
CONT1	I1	Edge code where feature enters cell from adjacent cell. For features that commence within the cell, CONT1 = 0. (see Figure 3)
CONT2	I1	Edge code where feature exits cell to adjacent cell. For features that terminate within the cell, CONT2 = 0. (see Figure 3)
FEALAB	A4	Country code (see Appendix C), or file/continent code (see 3.3.7) to left and right of feature, respectively.

The following format is used for Country Names:

CCODE	A2	2 letter country code.
CNAME	A20	Country name.
SCODE	A2	Sovereignty code (2 letter country code).

MIL-W-89012

Name	Format	Description
NSEGINFEA	I3	Number of segments comprising this feature.
NATTR	I3	Number of extra attribute records that immediately follow this header record. For shorelines and boundaries, NATTR = 0; for country names, NATTR = 1.
NFDATA REC	I2	Number of feature data records that follow.

FIGURE 3. Edge Codes.

(b) Extra attribute records: For WVS database Edition One, only country names use extra attribute records to describe the country's extent and the position of the country's name (approximate center). A country name shall be associated with the polygon formed by the appropriate boundary lines and shorelines. The maximum extent and approximate center of each polygon shall be determined through visual estimation. The following is a description of the country name extra attribute format.

Name	Format	Description
MINLNG	I8	Minimum longitude* (first integer meridian west of the country).
MINLAT	I7	Minimum latitude* (first integer parallel south of the country).
MAXLNG	I8	Maximum longitude* (first integer meridian east of the country).
MAXLAT	I7	Maximum latitude* (first integer parallel north of the country).
CENTLNG	I8	Approximate center longitude.*
CENTLAT	I7	Approximate center latitude.*
BLANK	3X	

MIL-W-89012

* Coordinates measured in degrees; divide by ORIGDEC (in File Header #1).

(c) Feature data records: All component segments of the current feature are listed here. Segments are identified by unique numeric keys (SEGNUM), and the ordering of points is provided (SEGDIR). Up to six pairs of (SEGNUM, SEGDIR) can be stored in a feature data record. As described in feature header record, the total number of pairs = NSEGINFEA; total number of feature data records = NFDATAREC.

Name	Format	Description
SEGNUM	I7	Segment identification number (unique in current cell) used to key to a segment record in this segment.
SEGDIR	A1	Direction of points in segment: "F" = Forward, or same order as stored "R" = Reverse of stored order "D" = Disjointed, same order as stored "E" = Disjointed, reverse order "I" = Inside, same order as stored "J" = Inside, reverse order

See Appendix D for explanation of terms.

(3) Segment records. Each cell contains the number of segments given in NSEGINCELL. Each segment has a header record, extra feature reference records if required, and (segment) data records.

(a) Segment header records: All features delineated by the segment are referenced here. Features are referenced by unique numeric keys (FEANUM) and feature orientation (FEAORI). Up to three pairs of (FEANUM, FEAORI) fit in a single segment header record. If NFEAINSEG > 3, the overflow feature references are stored in additional 48-byte extra feature reference records.

Name	Format	Description
SEGFLAG	A3	New segment marker = "SEG"
SEGNUM	I7	Segment key: a unique segment identification number.
NVERTS	I5	Number of vertices (x,y data points) in segment.
NFEAINSEG	I2	Number of features to which this segment belongs.
NXFEARECS	I2	Number of extra feature reference records immediately following this header record.
NSDATAREC	I5	Number of segment data records that follow.
FEANUM	I7	Feature key: a number identifying a

MIL-W-89012

Name	Format	Description
FEAORI	A1	feature to which this segment belongs. Feature orientation: the feature being represented: "L" = feature is left of line segment "R" = feature is right of line segment "C" = feature is coincident with line segment (Point features are defined to be coincident with segments)
FEANUM	I7	
FEAORI	A1	
FEANUM	I7	
FEAORI	A1	

(b) Extra feature reference records: The number of extra feature reference records used is NXFEARECS. The format is a repeating sequence of up to six pairs of (FEANUM, FEAORI), continued from the segment header record.

(c) Segment data records: A listing of NVERTS segment vertices, with coordinates expressed in longitude, latitude (XSECONDS, YSECONDS) pairs, up to four pairs per data record. The total number of data records is NSDATAREC, listed in the segment header record. Coordinates are stored in seconds of offset from the current cell's origin, with an implied decimal point of DATADEC.

To transform the vertices to global coordinates:

```

longitude = (LNGCELL / ORIGDEC) + [(XSECONDS / DATADEC) / 3600]
latitude  = (LATCELL / ORIGDEC) + [(YSECONDS / DATADEC) / 3600]

```

Name	Format	Description
XSECONDS	I6	Longitude in seconds of offset from cell origin.
YSECONDS	I6	Latitude in seconds of offset from cell origin.

3.4 Feature/Attribute Requirements.

3.4.1 General. This section identifies the features required in the World Vector Shoreline (WVS) file and provides additional information about each feature, and details about how and when it is used.

The features and attributes described in this section are based on the DMA Feature/Attribute Coding Standard (FACS), October 1987 Edition, contained in Section 100 (Glossary) of the MARK 90 Standards Document. The FACS provides a standard list of features, attributes, and attribute values used in the collection of digital data within DMA.

MIL-W-89012

3.4.2 FACS features. Each feature is assigned a five digit alphanumeric FACS code. FACS attributes are used to further describe or categorize a feature and are assigned a three letter alphabetic code. For each attribute several attribute values are shown to describe the feature at the most detailed level. The following list provides the FACS Numbers and feature names for all of the FACS features that are considered shoreline features for the WVS product. All of these features are digitized and coded as Coastal Shoreline (2A010) if they meet the inclusion conditions given for each feature in the following pages of this section.

2A010	Coastal Shoreline
	for the WVS product, the following FACS features are also coded as Coastal Shoreline (2A010).
2B020	Breakwater
2B140	Jetty
2B190	Pier/Wharf
2B230	Seawall
2H020	Canal
2H080	Lake/Pond
2H140	River/Stream
2J030	Glacier

The following boundary and name features are included in the WVS file.

6A095	Boundary
6A115	No Defined Boundary
6A125	Other Line of Separation
9A010	Name Location

The remainder of 3.4 is organized by the FACS features listed above. Information concerning attributes, inclusion conditions, and product generation rules for the WVS files is presented in the format shown in Figure 4.

<u>FACS Feature:</u>	FACS Feature name	<u>FACS Number:</u>	5 digit alphanumeric code
----------------------	-------------------	---------------------	---------------------------

Definition: FACS Feature definition

Attributes:

Attribute Values:

Attribute name (3-letter code)-
followed by the attribute definition.
definition,

Value number and value name,
followed by the value
if necessary

All required attributes and values are listed.

Inclusion Condition: Criteria that determine when the FACS feature is included in the World Vector Shoreline (WVS) data set.

Product Generation Rules: Rules that describe how a FACS feature is shown and any other rules or special treatment required by the feature.

FIGURE 4. FACS Feature Information Format.

MIL-W-89012

a. FACS Feature: Coastal Shoreline FACS Number: 2A010

Definition: The line where a landmass is in contact with a body of open water (excluding inland hydrography) at a specified vertical datum.

Attributes:

Attribute Values:

Vertical Datum Category (VDC)-
The vertical datum to which the
feature is referenced.

VDC007 Mean High Water

Inclusion Conditions: Coastal Shorelines are included in the WVS for the seven continents listed in 3.3.7, and all islands that have a length greater than 180 meters. The length of an island is the longer of two linear axes.

Product Generation Rules:

1. Generalization shall be commensurate with a graphic scale of 1:250,000.
2. Shorelines surrounding bays, fjords, and inlets are excluded when these features have entrances with widths less than 70 meters. The bay, fjord, or inlet is closed off by shoreline at the point where it becomes less than 70 meters wide.
3. If a group of islands exist in a cluster, and the islands are less than 70 meters apart, they are generalized and shown as a single island.
4. If an island is less than 70 meters from the shoreline of the mainland or a larger island, it is included as part of the larger feature.
5. Shoreline features shall be tagged with country codes. A two letter country code is added to the landward side of the shoreline feature. See Appendix C. The country code for the seaward side of the shoreline feature consists of a one digit file number (see 3.3.4), followed by one alpha character continent code (see 3.3.7). The data field FEALAB shall be filled with the two letter country code and the file/continent code. The first two characters label the left side of the feature, as defined by the direction of digitization. The second two characters label the right side of the feature.

MIL-W-89012

b. FACS Feature: BreakwaterFACS Number: 2B020

Definition: A structure which protects a harbor or beach from forces of the sea.

Attributes:Attribute Values:

Vertical Reference Category (VRC) -
Not Relative location referenced to a
sounding datum, unless otherwise
indicated.

VRC001 Above Surface/Does
Cover (at High Water)

Width (WID) - A measurement of the
shorter of two linear axes in meters.
For a square feature, measure either
axis. For a round feature, width
shall be equal to length.

WID > 70 meters

Inclusion Conditions: Breakwaters are included if they extend above high
water and have a width greater than 70 meters.

Product Generation Rules:

1. Breakwaters are treated as coastal shoreline (2A010).

MIL-W-89012

c. FACS Feature: JettyFACS Number: 2B140

Definition: A man-made barrier built out into the water to restrain or direct currents or waves.

Attributes:

Vertical Reference Category (VRC) -
Not
Relative location referenced to a
sounding datum, unless otherwise
indicated.

Attribute Values:

VRC001 Above Surface/Does
Cover (at High Water)

Width (WID) - A measurement of the
shorter of two linear axes in meters.
For a square feature, measure either
axis. For a round feature, width
shall be equal to length.

WID > 70 meters

Inclusion Conditions: Jetties are included if they extend above high water and have a width greater than 70 meters.

Product Generation Rules:

1. Jetties are treated as coastal shoreline (2A010).

MIL-W-89012

d. FACS Feature: Pier/WharfFACS Number: 2B190

Definition: Berthing places for vessels. Pier - a long narrow structure extending into the water; Wharf - approximately parallel to the shoreline and accommodates ships on one side only.

Attributes:Attribute Values:

Width (WID) - A measurement of the shorter of two linear axes in meters. For a square feature, measure either axis. For a round feature, width shall be equal to length.

WID > 70 meters

Inclusion Conditions: Piers are included if the width is greater than 70 meters. Wharves are included to connect segments of included shoreline (2A010).

Product Generation Rules:

1. Piers and wharves are treated as coastal shoreline (2A010).

MIL-W-89012

e. FACS Feature: Seawall

FACS Number: 2B230

Definition: A structure built to protect the shore from erosion.

Attributes:

Attribute Values:

No attributes required.

Inclusion Conditions: Seawalls are required if they connect segments of included coastal shoreline (2A010).

Product Generation Rules:

1. Seawalls are treated as coastal shoreline (2A010).

MIL-W-89012

f. FACS Feature: CanalFACS Number: 2H020

Definition: A man-made or improved natural waterway used for transportation.

Attributes:Attribute Values:

Width (WID) - A measurement of the shorter of two linear axes in meters. For a square feature, measure either axis. For a round feature, width shall be equal to length.

WID > 70 meters

Inclusion Conditions: Canals with a width of greater than 70 meters are shown for a distance of 1852 meters (1 nautical mile) inland from the well defined canal entrance.

Product Generation Rules:

1. Canals are treated as coastal shoreline (2A010).

MIL-W-89012

g. FACS Feature: Lake/PondFACS Number: 2H080

Definition: An inland body of water surrounded by land, where no appreciable current or flow pattern is evident.

Attributes:Attribute Values:

Distance From Shoreline (DFS) -
The distance between the feature
and the closest coastal shoreline
(2A010).

DFS < 1852 meters

Width (WID) - A measurement of the
shorter of two linear axes in meters.
For a square feature, measure either
axis. For a round feature, width
shall be equal to length.

WID > 70 meters

Inclusion Conditions: Lakes are included if they are located less than 1852 meters (1 nautical mile) from the coastal shoreline and they are connected to the sea by a river that has a width greater than 70 meters.

Product Generation Rules:

1. Lakes are treated as coastal shoreline (2A010).

MIL-W-89012

h. FACS Feature: River/StreamFACS Number: 2H140Definition: A natural flowing watercourse.Attributes:Attribute Values:

Width (WID) - A measurement of the shorter of two linear axes in meters. For a square feature, measure either axis. For a round feature, width shall be equal to length.

WID > 70 meters

Inclusion Conditions: Rivers with a width of greater than 70 meters are shown for a distance of 1852 meters (1 nautical mile) inland from the well defined river mouth.

Product Generation Rules:

1. Rivers are treated as coastal shoreline (2A010).

MIL-W-89012

i. FACS Feature: Glacier

FACS Number: 2J030

Definition: A large mass of snow and ice moving slowly down slope or valley from above the snowline.

Attributes:

Attribute Values:

No attributes required.

Inclusion Conditions: Glaciers are included if the outer extremities of the glacier form the apparent shoreline.

Product Generation Rules:

1. The seaward edge of the glacier is treated as coastal shoreline (2A010).

MIL-W-89012

j. FACS Feature: BoundaryFACS Number: 6A095Definition: A line of demarcation between political areas.Attributes:Attribute Values:

Boundary Status (BST) - Degree of agreement on or precision of a boundary.

BST001 Recognized
BST002 Disputed
BST003 Indefinite

First Name (NM3) - Name of political entity on one side of a boundary

NM3 any

Second Name (NM4) - Name of political entity on other side of a boundary

NM4 any

Use Status (USE) - Identifies the primary user, function, or controlling authority.

USE023 International

Inclusion Conditions: All International Boundaries are included.Product Generation Rules:

1. The first two alphanumeric characters in the FEALAB field of the WVS data set shall be the country code (See Appendix C) of the country on the left side of the feature, as defined by the direction of digitization. The second two alphanumeric characters in FEALAB shall be the country code of the country on the right side of the feature.

MIL-W-89012

k. FACS Feature: No Defined Boundary FACS Number: 6A115

Definition: A line representing an arbitrary closure of polygons for areas whenno defined boundary exists.

Attributes:

Attribute Values:

First Name (NM3) - Name of political entity on one side of a boundary

NM3 any

Second Name (NM4) - Name of political entity on other side of a boundary

NM4 any

Inclusion Conditions: Lines representing no defined boundary are required to make closed polygons of the following countries:

Oman
Saudi Arabia
Yemen (Aden)
United Arab Emirates
Yemen (Sanna)

Product Generation Rules

1. The first two alphanumeric characters in the FEALAB field of the WVS data set shall be the ountry code (See Appendix C) of the country on the left side of the feature, as defined by the direction of digitization. The second two alphanumeric characters in FEALAB shall be the country code of the country on the right side of the feature.

MIL-W-89012

1. FACS Feature: Other Line of
Separation

FACS Number: 6A025

Definition: A line separating countries or areas that is not recognized as a political boundary.

Attributes

Attribute Values

First Name (NM3) - Name of political
entity on one side of a boundary

NM3 any

Second Name (NM4) - Name of political
entity on other side of a boundary

NM4 any

Inclusion Conditions: Other lines of separation are required for the following areas:

Administrative Boundary between Sudan/Egypt and Sudan/Kenya.

Administrative Line between Oman/Yemen (Aden) and Oman/United Arab Emirates.

Armistice Line for the borders of Israel.

Cease-Fire Line between India/Pakistan.

Claim Line between China/India, for that area claimed by India.

Demarcation Line between Democratic Peoples Republic of Korea/Republic of Korea.

Limit of Control between China/India, for that area controlled by China.

Lines of Separation around Guantanamo Bay, Berlin, and the border between German Democratic Republic/Federal Republic of Germany.

Provisional Administrative Line between Ethiopia/Somalia.

Zone of Occupation for the West Bank and Gaza Strip.

Product Generation Rules:

1. The first two alphanumeric characters in the FEALAB field of the WVS data set shall be the country code (See Appendix C) of the country on the left side of the feature, as defined by the direction of digitization. The second two alphanumeric characters in FEALAB shall be the country code of the country on the right side of the feature.

MIL-W-89012

m. FACS Feature: Name Location
(NOT IN FACS)

FACS Number: 9A010

Definition: A geographic position located at the approximate center of a named area where a place name is displayed.

Attributes:

Attribute Values:

Name Category (NAM) - The proper name, identifying code, or number of a feature.

NAM000 any

Inclusion Conditions: One Name Location is required for each polygon included in the WVS file.

Product Generation Rules:

1. The country name shall be shown by the WVS data field CNAME (see Appendix C).
2. The position of the country name shall be located approximately in the center of the country. The latitude of this position shall be recorded in the WVS data field CENTLAT. The longitude of this position shall be recorded in the WVS data field CENTLNG.
3. Only those countries listed by two letter country codes in Appendix C are included in the WVS.
4. Generally, all polygons in the WVS file require a name location point; however, under certain conditions this would lead to an excessive number of names included in the WVS data set. Therefore, name location points of islands may be thinned, based on the following criteria:
 - a. If all islands in a group belong to the same country, it is not necessary to place a name location point in each island polygon. Instead, a name location point shall be positioned in the approximate center of the island group.
 - b. If islands in a group belong to different countries, a name location point shall be positioned in the approximate center of each island polygon.
 - c. Name location points shall be included on all islands that have an area greater than 100 square kilometers.

MIL-W-89012

4. QUALITY ASSURANCE

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements; however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Final product quality. Final product quality will reflect the quality expressed by each applicable military standard.

5. PACKAGING This section is not applicable to this specification.

6. NOTES

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

6.1 Definitions. This section is not applicable to this specification.

6.2 Supersession. These specifications supersede Defense Mapping Agency Product Specifications for World Vector Shoreline, PS/2GC/030, First Edition, May 1988.

6.3 Intended use. World Vector Shoreline is intended to be used in TOMAHAWK shipboard and shore mission planning, AEGIS command displays, Tactical Flag Command Center displays, and various other computer display command and control systems.

6.4 International Standardization Agreements. Certain provisions of this specification are subject of international standardization agreement. When amendment, revision, or cancellation of this specification is proposed that will modify the international agreement concerned, the preparing activity will take appropriate action through international standardization channels, including departmental standardization offices, to change the agreement or make other appropriate accommodations.

MIL-W-89012

6.4.1 International Standardization Agreements (STANAGs). This section is not applicable to this specification.

6.4.2 Quadripartite Standardization Agreements (OSTAGs). This section is not applicable to this specification.

6.4.3 Air Standardization Coordinating Committee Agreements (ASCC AIR STDs/STDs/ADV PUBs). This section is not applicable to this specification.

6.4.4 International MC&G Agreements. This section is not applicable to this specification.

6.4.5 Executive Orders. This section is not applicable to this specification.

6.4.6 Inter-Agency Agreements. This section is not applicable to this specification.

6.4.7 Other documentation. This section is not applicable to this specification.

MIL-W-89012

APPENDIX A

COMPARISON OF "CHAIN-NODE" WITH SEQUENTIALLY STORED DATA

10. GENERAL

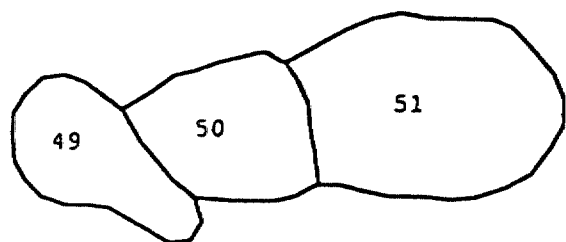
10.1 Scope. An important aspect of WVS is the use of a "chain-node" data structure to store cartographic features. This data structure, adapted from DMA's Standard Linear Format (SLF), eliminates both redundant segment storage and erroneous overlaps and gaps between segments of adjacent features. The following example serves to show the differences between storing data sequentially and structuring the data in a chain-node form.

10.2 Sequential structure. Figure 5a shows three adjacent areal features as they might appear on a map. In the sequential storage method, each feature would be treated as a separate polygon, digitized independently (Figure 5b), and stored as a string of X,Y coordinates. The common boundary between two abutting features would be digitized twice, and the two versions may not coincide. This often results in gaps or overlaps along the boundary (Figure 5c).

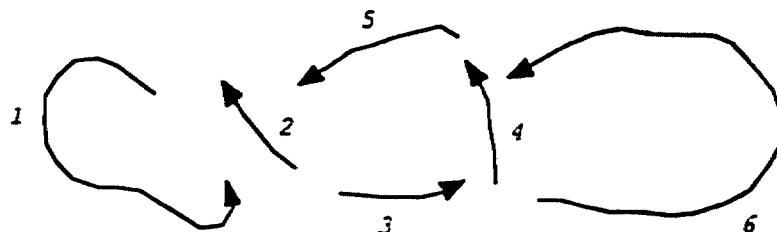
10.3 Chain-node structure. In the chain-node method, the segments that comprise the features are digitized as shown in Figure 5d. The common boundary between adjacent features is digitized and stored only once, so that the features abut precisely. The coordinates of each segment are stored with a unique alphanumeric segment ID with pointers to the features associated with that segment. Each feature is also stored with a unique ID with pointers to the segments that comprise it. Therefore, features may be displayed either separately (Figure 5e) or together (Figure 5f). Since a segment may be used more than once in displaying adjacent features, WVS provides a segment direction indicator (e.g., Forward or Reverse) to order the segment coordinates and to delineate features properly. Appendix D describes in greater detail the segment directions used by WVS.

20. APPLICABLE DOCUMENTS This section is not applicable to this Appendix.

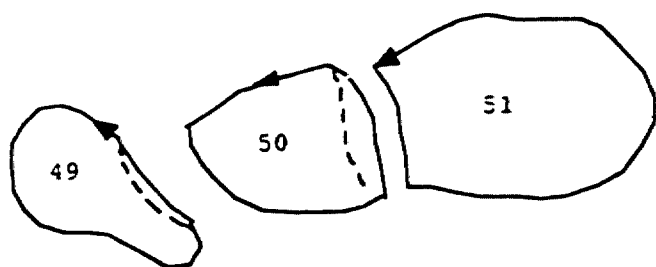
MIL-W-89012

SEQUENTIAL DATA STORAGE

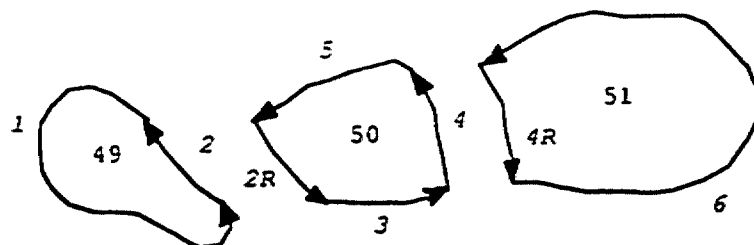
(a) Features on a map

CHAIN-NODE DATA STORAGE

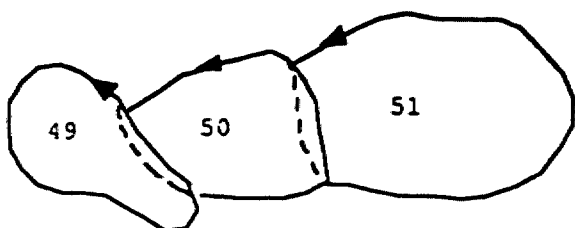
(d) Digitized Segments



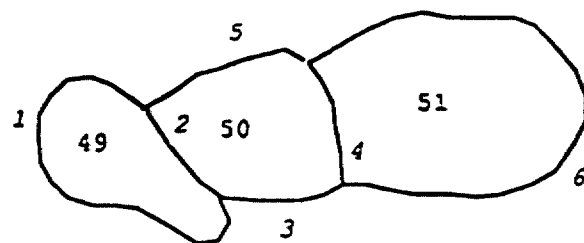
(b) Digitized Polygons



(e) Individually Displayed WVS Features



(c) Display of Data Stored Sequentially



(f) Display of Data Stored in Chain-Node Structure

Sequential vs. Chain-Node Methods of Cartographic Data Storage. Arrows indicate the ordering of coordinates within a segment: solid lines represent digitized outlines; dashed lines represent true boundaries.

FIGURE 5. Sequential vs. chain-node methods of cartographic data storage.

MIL-W-89012

APPENDIX B

SAMPLE WVS FILE LISTING

10. GENERAL

10.1 Scope. This appendix illustrates how WVS files are organized. This appendix is a mandatory part of the specification. The information contained herein is intended for compliance.

File Header #1

A20	11112	1X1A8	1X114	1X115	115	1
TITLE	PRODUCER		COMPDATE	DATADEC		
	EDITION		ORIGDEC			
	FILENUM					

FileHeader #2

118	117	113	118	117	118	117	1
LNGOR	LATOR	LNGSW		LATSW	LNGNE	LATNE	
XMAP							

File Header #3

117	1X117	1X117	1X117	1X114	1X113	1X112	XXXXXX1
NFEA	NPOINTS	NLINES	NAREAS	NCODES	MFEAperSEG		
MSEGperFEA							

File Header #4

117	1X115	1X119	1X114	1X114	1X116	1X114	XXXX1
NSEG	ISCALE		XCELL	YCELL	NCELLS	NTEXT	
MVERTperSEG							

Cell Header

1A1A11116	118	117	115	115	117	117	1
	LNGCELL	LATCELL	NFEAREC NSEGEC				
CELLNUM	NSEGINCELL						
NCELLHEAD	NFEAinCELL						
CELLTYPE							
CELLFLAG							

MIL-W-89012

MIL-W-89012

Feature Header
(Shorelines/Boundaries)

1A3	1A7	1A1A5	1A6	1A6	1A6	1111A4	113	113	1121
FEANUM	FACS	ATTVAL	ATTVAL	ATTVAL					NFDATAREC
FEAFLAG	FEATYPE							NATTR	
								NSEGINFEA	
								FEALAB	
								CONT2	
								CONT1	

Feature Header
(Country Names)

1A3	117	1A1A5	1A21A20			1A2113	113	1121
FEANUM	FACS	CNAME						NFDATAREC
FEAFLAG	FEATYPE	CCODE						NATTR
								NSEGINFEA
								SCODE

Extra Attribute Record

118	117	118	117	118	117	1XXX1
MINLNG	MINLAT	MAXLNG	MAXLAT	CENTLNG	CENTLAT	

Feature Data Record

117	1A117	1A117	1A117	1A117	1A117	1A1
SEGNUM	SEGNUM	SEGNUM	SEGNUM	SEGNUM	SEGNUM	SEGDIR
	SEGDIR	SEGDIR	SEGDIR	SEGDIR	SEGDIR	

Segment Header Record

1A3	117	115	112112115	117	1A117	1A117	1A1
SEGNUM	NVERTS		FEANUM	FEANUM	FEANUM	FEAORI	
SEGFLAG			NSDATAREC	FEAORI	FEAORI		
			NXFEARECS				
			NFEAinSEG				

MIL-W-89012

Segment Data Record

116	116	116	116	116	116	116	116	1
XSECONDS		XSECONDS		XSECONDS		XSECONDS		
	YSECONDS		YSECONDS		YSECONDS		YSECONDS	

20. APPLICABLE DOCUMENTS This section is not applicable to this appendix.

MIL-W-89012

APPENDIX C

COUNTRY CODES AND COUNTRY NAMES

10. GENERAL

10.1 Scope. The following pages list country codes and country names used in the attribute buffer (ATTRIB field) of the Feature Header Records (see 3.3.8.2.2). These codes and names are based on the Federal Information Processing Standards Publication - Countries, Dependencies, Areas of Special Sovereignty, and Their Principle Administrative Divisions (FIPS Pub. 10-3). This appendix is a mandatory part of the specification. The information contained herein is intended for compliance.

10.2 Abbreviations. The attribute buffer contains only twenty characters for country names. The following abbreviations shall be used to enable the country names to fit into the available space. These abbreviations apply to the WVS product only.

&	and
BR	British
FED	Federated
FR	France or French
I	Island
IS	Island(s)
P	Peoples
R	Republic
S	South
SOC	Socialist
SOV	Soviet
STS	States
TE	Territory
TR	Trust
U	Union
UAE	United Arab Emirates
UN	United Nations
VINC	Vincent
ZO	Neutral Zone

10.3 Country codes and names.

Country Code	Country Name
AA	ARUBA
AF	AFGHANISTAN
AL	ALBANIA
AG	ALGERIA
AQ	AMERICAN SAMOA
AN	ANDORRA
AO	ANGOLA
AV	ANGUILLA
AY	ANTARCTICA
AC	ANTIGUA AND BARBUDA

MIL-W-89012

AR	ARGENTINA
AT	ASHMORE&CARTIER IS
AS	AUSTRALIA
AU	AUSTRIA
BF	BAHAMAS
BA	BAHRAIN
FQ	BAKER ISLAND
BG	BANGLADESH
BB	BARBADOS
BS	BASSAS DA INDIA
BE	BELGIUM
BH	BELIZE
BN	BENIN
BD	BERMUDA
BT	BHUTAN
BL	BOLIVIA
BC	BOTSWANA
BV	BOUVET ISLAND
BR	BRAZIL
IO	BR INDIAN OCEAN TE
VI	BRITISH VIRGIN IS
BX	BRUNEI
BU	BULGARIA
UV	BURKINA
BM	BURMA
BY	BURUNDI
CB	CAMBODIA
CM	CAMEROON
CA	CANADA
CV	CAPE VERDE
CI	CAYMAN ISLANDS
CT	CENTRAL AFRICAN R
CD	CHAD
CI	CHILE
CH	CHINA
KT	CHRISTMAS ISLAND
IP	CLIPPERTON ISLAND
CK	COCOS (KEELING) IS
CO	COLOMBIA
CN	COMOROS
CF	CONGO
CW	COOK ISLANDS
CR	CORAL SEA ISLANDS
CS	COSTA RICA
CU	CUBA
CY	CYPRUS
CZ	CZECHOSLOVAKIA
DA	DENMARK
DJ	DJIBOUTI
DO	DOMINICA
DR	DOMINICAN REPUBLIC
EB	EAST BERLIN
EC	ECUADOR
EG	EGYPT
ES	EL SALVADOR

MIL-W-89012

EK	EQUATORIAL GUINEA
EN	ESTONIA
ET	ETHIOPIA
EU	EUROPA ISLAND
FA	FALKLAND/MALVINAS IS
FO	FAROE ISLANDS
FM	FEDSTS OF MICRONESIA
FJ	FIJI
FI	FINLAND
FR	FRANCE
FG	FRENCH GUIANA
FP	FRENCH POLYNESIA
FS	FR S&ANTARCTIC LANDS
GB	GABON
GA	GAMBIA, THE
GZ	GAZA STRIP
GC	GERMAN DEMOCRATIC R
GE	GERMANY FEDERAL R OF
GH	GHANA
GI	GIBRALTAR
GO	GLORIOSO ISLANDS
GR	GREECE
GL	GREENLAND
GJ	GRENADA
GP	GUADELOUPE
GQ	GUAM
GT	GUATEMALA
GK	GUERNSEY
GV	GUINEA
PU	GUINEA-BISSAU
GY	GUYANA
HA	HAITI
HM	HEARD I&MCDONALD IS
HO	HONDURAS
HK	HONG KONG
HQ	HOWLAND ISLAND
HU	HUNGARY
IC	ICELAND
IN	INDIA
ID	INDONESIA
IR	IRAN
IZ	IRAQ
IY	IRAQ-SAUDI ARABIA ZO
EI	IRELAND
IS	ISRAEL
IT	ITALY
IV	IVORY COAST
JM	JAMAICA
JN	JAN MAYEN
JA	JAPAN
DQ	JARVIS ISLAND
JE	JERSEY
JQ	JOHNSTON ATOLL
JO	JORDAN
JU	JUAN DE NOVA ISLAND

MIL-W-89012

KE	KENYA
KQ	KINGMAN REEF
KR	KIRIBATI
KN	KOREA DEMOCRATIC P R
KS	KOREA, R OF
KU	KUWAIT
LA	LAOS
LG	LATVIA
LE	LEBANON
LT	LESOTHO
LI	LIBERIA
LY	LIBYA
LH	LITHUANIA
LS	LIECHTENSTEIN
LU	LUXEMBOURG
MC	MACAU
MA	MADAGASCAR
MI	MALAWI
MY	MALAYSIA
MV	MALDIVES
ML	MALI
MT	MALTA
IM	MAN, ISLE OF
RM	MARSHALL ISLANDS
MB	MARTINIQUE
MR	MAURITANIA
MP	MAURITIUS
MF	MAYOTTE
MX	MEXICO
MQ	MIDWAY ISLANDS
MN	MONACO
MG	MONGOLIA
MH	MONTSERRAT
MO	MOROCCO
MZ	MOZAMBIQUE
WA	NAMIBIA
NR	NAURU
BQ	NAVASSA ISLAND
NP	NEPAL
NL	NETHERLANDS
NA	NETHERLANDS ANTILLES
NC	NEW CALEDONIA
NZ	NEW ZEALAND
NU	NICARAGUA
NG	NIGER
NI	NIGERIA
NE	NIUE
NF	NORFOLK ISLAND
CQ	NORTHERN MARIANA IS
NO	NORWAY
OS	NO SOVEREIGNTY
MU	OMAN
PK	PAKISTAN
LQ	PALMYRA ATOLL
PM	PANAMA

MIL-W-89012

PP	PAPUA NEW GUINEA
PF	PARACEL ISLANDS
PA	PARAGUAY
PE	PERU
RP	PHILIPPINES
PC	PITCAIRN ISLANDS
PL	POLAND
PO	PORTUGAL
RQ	PUERTO RICO
QA	QATAR
QX	COLOMBIA/NICARAGUA
QY	IRAN/UAE
QZ	QATAR/BAHRAIN
RE	REUNION
RO	ROMANIA
RW	RWANDA
SC	ST CHRISTOPHER&NEVIS
SH	SAINT HELENA
ST	SAINT LUCIA
SB	ST PIERRE & MIQUELON
VC	ST VINC&GRENADINES
SM	SAN MARINO
TP	SAO TOME&PRINCIPE
SA	SAUDI ARABIA
SG	SENEGAL
SE	SEYCHELLES
SL	SIERRA LEONE
SN	SINGAPORE
BP	SOLOMON ISLANDS
SO	SOMALIA
SF	SOUTH AFRICA
SP	SPAIN
PG	SPRATLY ISLANDS
CE	SRI LANKA
SU	SUDAN
NS	SURINAME
SV	SVALBARD
WZ	SWAZILAND
SW	SWEDEN
SZ	SWITZERLAND
SY	SYRIA
TZ	TANZANIA UNITED R OF
TH	THAILAND
TO	TOGO
TL	TOKELAU
TN	TONGA
TD	TRINIDAD AND TOBAGO
TE	TROMELIN ISLAND
NQ	TR TE OF THE PACIFIC
TS	TUNISIA
TU	TURKEY
TK	TURKS&CAICOS IS
TV	TUVALU
UG	UGANDA
UR	U OF SOV SOC R

MIL-W-89012

TC	UNITED ARAB EMIRATES
UK	UNITED KINGDOM
UN	UN CONTROL
US	UNITED STATES
UY	URUGUAY
NH	VANUATU
VT	VATICAN CITY
VE	VENEZUELA
VM	VIETNAM
VQ	VIRGIN ISLANDS
WQ	WAKE ISLAND
WF	WALLIS AND FUTUNA
WE	WEST BANK
WB	WEST BERLIN
WI	WESTERN SAHARA
WS	WESTERN SAMOA
YS	YEMEN (ADEN)
YE	YEMEN (SANAA)
YO	YUGOSLAVIA
CG	ZAIRE
ZA	ZAMBIA
ZI	ZIMBABWE
TW	TAIWAN
ZZ	CANARY ISLANDS

20. APPLICABLE DOCUMENTS This section is not applicable to this appendix.

MIL-W-89012

APPENDIX D

WVS SEGMENT DIRECTION

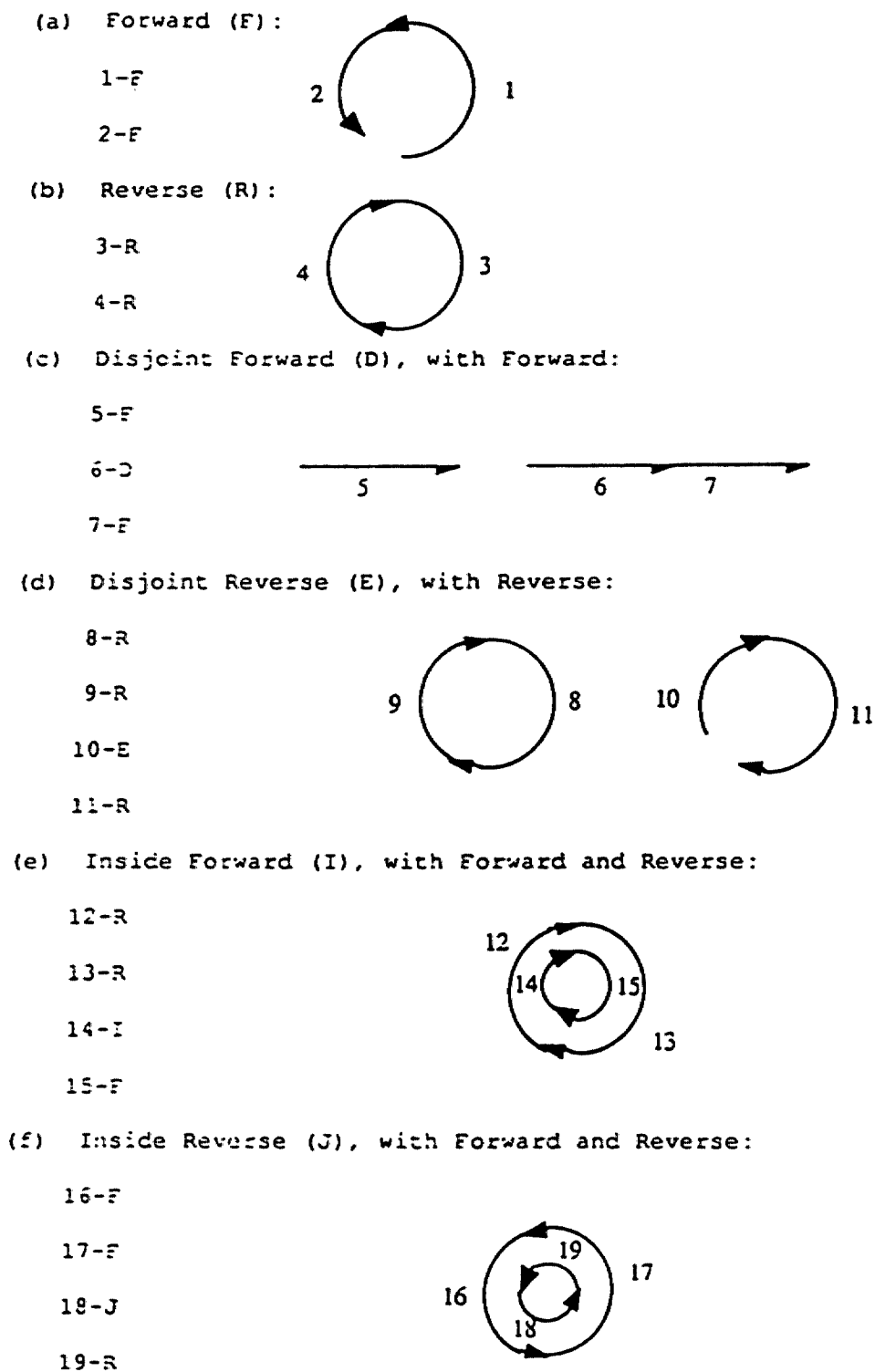
10. GENERAL

10.1 Scope. To identify the features associated with segments in a WVS file, it is necessary to first identify the direction in which the segments are stored; e.g., the statement "Water is to the left of this segment" makes no sense unless the direction of "this segment" is given. WVS uses six different types of segment direction. These types are stored as one character codes (SEGDIR in the feature data records) and are identical to those used in DMA's Standard Linear Format (SLF). Each of these codes is described below, and examples are illustrated in Figure 6. This appendix is a mandatory part of this specification. The information contained herein is intended for compliance.

SEGDIR	Direction	Description
F	Forward	Points are to be retrieved in the same order as stored (Figure 6a).
R	Reverse	Points are to be retrieved in the reverse of the stored order (Figure 6b).
D	Disjointed Forward	Same as Forward, but the segment is in a disjointed part of the area or linear feature (Figure 6c).
E	Disjointed Reverse	Same as Reverse, but the segment is in a disjointed part of the area or linear feature (Figure 6d).
I	Inside Forward	Same as Forward, but the segment describes a hole or island within an area feature (Figure 6e).
J	Inside Reverse	Same as Reverse, but the segment describes a hole or island within an area feature (Figure 6f).

20. APPLICABLE DOCUMENTS This section is not applicable to this appendix.

MIL-W-89012

FIGURE 6. Examples of segment direction.

MIL-W-89012

INDEX

	<u>PARAGRAPH</u>	<u>PAGE</u>
Accuracy.	3.1	2
Air standardization coordinating committee agreements (ASCC AIR STDs/STDs/ADV PUBs).	6.4.3	32
APPENDIX A Comparison of "chain-node" with sequentially structured data.		33
B Sample WVS file listing		35
C Country codes and country names		38
D WVS segment direction		44
Applicable documents.	2.	2
Cell description.	3.3.6	7
Cell header	3.3.8.2.1	12
Country names	3.1.3	3
Data cells.	3.3.8.2	11
Data records.	3.3.7.2	9
Datum	3.2	3
Definitions	6.1	31
Executive orders.	6.4.5	32
FACS features	3.4.2	16
Feature/Attribute requirements.	3.4	16
Feature coordinates	3.3.8	9
Feature description	3.3.7	8
Feature records	3.3.8.2.2	12
File description.	3.3.4	4
File header records	3.3.8.1	10
File organization	3.3.5	7
File structure.	3.3.9	10
Final product quality	4.1.2	31
General	3.3.1	3
	3.4.1	16
Government documents.	2.1	2
Header records.	3.3.7.1	9
Horizontal accuracy	3.1.1	3
Intended use.	6.3	31
Inter-agency agreements	6.4.6	32
International MC&G agreements	6.4.4	32
International standardization agreements.	6.4	31
International standardization agreements (STANAGs).	6.4.1	32
Non-Government publications	2.2	2
Notes	6.	31
Order of precedence	2.3	2
Other documentation	6.4.7	32
Other Government documents, drawings, and publications.	2.1.2	2
Packaging	5.	31
Physical characteristics of magnetic tape	3.3.2	4
Product classification.	1.3.2	2
Product format.	3.3	3
Purpose	1.2	1
Quadripartite standardization agreements (QSTAGs)	6.4.2	32
Requirements.	3.	2
Responsibility for compliance	4.1.1	31
Responsibility for inspection	4.1	31

MIL-W-89012

	<u>PARAGRAPH</u>	<u>PAGE</u>
Scope	1.1	1
Security.	1.3	1
Security classification	1.3.1	1
Segment records	3.3.8.2.3	15
Specifications, standards, and handbooks.	2.1.1	2
Supersession.	6.2	31
Type of input/output.	3.3.3	4
Vertical accuracy	3.1.2	3

MIL-W-89012

CONCLUDING MATERIAL

Custodians:

DMA - MP

Preparing activity:

DMA - MP

Review activities:

Air Force - 09

Army - CE

Navy - NO

(project MCGT-0015)

User activities:

Air force - 09

Army - CDRUSAETL-CEETL-TC-SA;
CDR25THINFDIV-APVG-DS; HQWESTCOM-APIN-MCG
USAATCAAS-ASQ-AS-AI; USA-FSTC-CB1

Navy - HQFMFEUR-USNAVACTS-UK;
CINCUSNAVEUR-N39, ECJ2-T;
CINCUSPAC-J37

Marine Corps - CGFMFLANT-AC/S;
CGFMFPAC-AC/S; CGMCCDC-IN11

DMA - DMAAC-DAP; DMACSC-LANT;
DMAHTC-IAGS, LOU-LUA, LOU-VRM,
SXO-SXM

DMS - DMS-MTM

Other - Canada: HQND-MCE

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 copies 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-W-89012	2. DOCUMENT DATE (YYMMDD) 27 July 1990
3. DOCUMENT TITLE Military Specification for World Vector Shoreline			
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 Defense Mapping Agency		b. TELEPHONE (Include Area Code) (1) Commercial (703)285-9199	(2) AUTOVON 356-9198
c. ADDRESS (Include Zip Code) ATTN: PRS 8613 Lee Highway, Fairfax, VA 22031-2137		IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:	