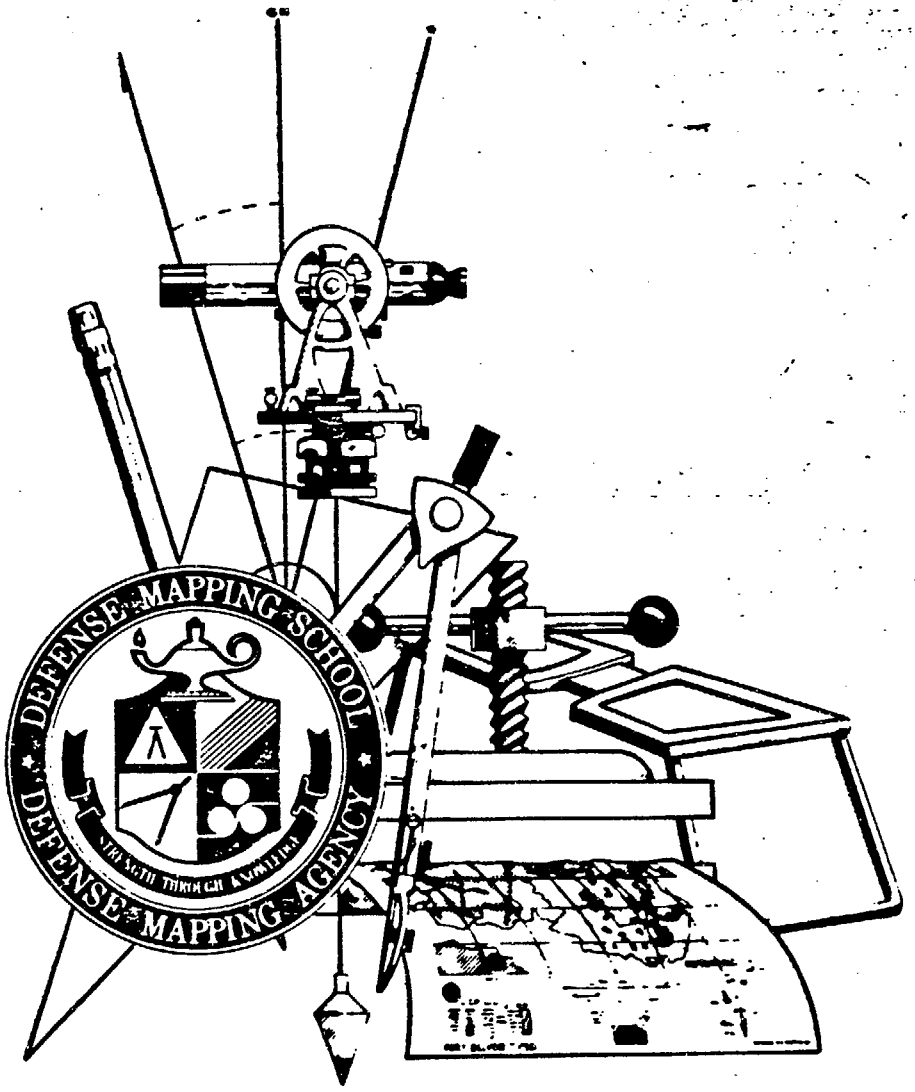
DMA

# STUDENT HANDOUT

# Digital Topographic Data




DEFENSE
MAPPING SCHOOL
FORT BELVOIR, VIRGINIA

DMS NO. ST 481

APR 1982

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# MC&G TERMS FOR DIGITAL DATA

## Introduction

1. This list provides definitions of selected terms currently used by the Defense Mapping Agency (DMA) in correspondence, specifications, and other forms of communication referring to digital mapping. The list includes not only terms specifically pertaining to digital data, but also related MC&G terms such as circular error, circular error probable, conversion, horizontal accuracy, and linear error.

2. The list has been prepared specifically to remedy apparent gaps in communication or misunderstandings that have arisen in connection with digital data terminology. The increase in recent years of requirements for MC&G information in digital form has resulted in a proliferation of new terms. Many of these terms have synonymous or overlapping meanings. Because digital mapping technology continues to evolve, new terms frequently supplant those formerly used (e.g., Digital Landmass System (DLMS) Data Base has replaced Digital Radar Landmass Simulator (DRLMS) Data Base). It is anticipated that this evolution will continue and that additional terms will be needed to describe new procedures, types of data, and data bases. However, it is the intent of DMA to standardize terminology as much as possible.

3. Alphabetization of terms in this list follows the standard A through Z order except that multiword terms are alphabetized according to the initial word.

4. Multiple definitions for a single term are included, as necessary, to describe both the classical meaning of the term and the specific use of the term in referring to digital mapping. The designation (ISO) indicates terms and definitions used in information processing activities that have been approved by the International Organization for Standardization.

5. When two or more terms have identical meaning, the definition has been applied only to the preferred term, followed by the expression "Also called" and a list of the synonyms. At the end of some definitions the user's attention is directed to related terms by the expression "See also." Reference is also made to published DMA product specifications for the preparation of digital data and digital data bases.

areal feature - 1. A topographic feature, such as sand, swamp, vegetation,etc. which extends over an area. It is represented on the published map or chart by a solid or screened color, by a prepared pattern of symbols, or by a delimiting line. 2. (digital mapping) Any area enclosed by a delimiting line that has any unique characteristic (e.g., forest, residential area, industrial area).

array - An arrangement of elements in one or more dimensions.

border matching - The process by which individual digital data sets are joined together through merging/smoothing utilizing computer applications software.

boundary discontinuities - Different elevation values for common DMA standard digital terrain elevation data (DTED) matrix points in adjacent data files.

boundary point averaging - Averaging the elevations of common points from two different data sets and reassigning each the average value; or resolving a discrepancy between two elevations for a common point by assigning tne average elevation value to that point.

boundary point weighted averaging - Resolving a discrepancy between a series of overlapping elevations from two data sets by biasing one data set utilizing either the accuracy of a data set or the relative distance to the edge of the data set.

circular error - 1. An accuracy figure representing the stated percentage of probability that any point expressed as a function of two linear components (e.g., horizontal position) will be within plus or minus the given figure. Commonly used are CEP (50%), CE 1$\sigma$ (39.35%), and CE (90%). 2. A two-dimensional error (X, Y, Easting/Northing, or $\lambda/\phi$) used to express the horizontal positional accuracy of planimetric features in a digital data base or on a chart/map. The probability of error is in a circular distribution and is a function of the radius of a circle centered on the mean of the error distribution. Circular error, therefore, is expressed as a quantity at some percentage probability level, e.g., 110 meters @ CE 90% indicates a probability that 90% of the errors fall within a 110 meter circle. 90% is the probability level commonly used in mapping and digital cartography.

circular error probable (CEP) - The 50% circular error interval based on the bivariate normal distribution function.

compacted data - Digital data that have been reduced in volume. (1) by use of high density storage media, (2) by use of better format or codes to provide storage of numbers, and (3) by direct mathematical operations to reduce redundancy.

conversion - 1. The changing of one system of measurement to another, e.g., converting meters to feet. Conversion is usually accomplished by the use of conversion factors, scales, and tables. (2). (digital mapping) The process of changing the form in which digital data are expressed. This may include transformation to a new coordinate system, increasing or decreasing density of elevation posts or altering the areal distribution of elevation points. Specific example is converting elevation array from UTM spacings to geographic spacing. See also transformation program.

data bank - 1. (ISO) A set of libraries of data. 2. A comprehensive collection of libraries of data. For example, one line of a management information report may form an item, a complete report may form a record, a complete set of such records may form a file, the collection of different reports may form a library, and the libraries used by an organization are known as its data bank. 3. The sum total of all related data bases together with a centralized information storage and retrieval system which can be inventoried and accessed. See also data bank hierarchy, data base.

data bank hierarchy - A formalized structure which provides for the organization of data at various quantitative levels; e.g.,

```
data bank
   data base
      file
          record
              field (element)
                 character
                     bit
```

data base - 1. (ISO) A set of data, part or the whole of another set of data, and consisting of at least one file that is sufficient for a given purpose or for a given data processing system. 2. A collection of data fundamental to a system. 3. (digital mapping) An organized set of evaluated MC&G data stored in either graphic, textual, or digital form. A data base may contain one file of data (e.g., terrain elevation data) or several data files (e.g., cartographic, geodetic). There are three kinds of data bases: (1) those that contain information about information; (2) those that contain information about data; and (3) those that contain the actual data.

data base system - A collection of men, machines, and methods organized to accomplish all of the functions of a data base.

data smoothing - A process which reduces the frequency content of digital data. The information eliminated may be real or artificially introduced from collection processes. The intent is to eliminate and replace inconsistent digital data to provide a more understandable portrayal of the earth's surface.

data spacing - The distance between centers of digital data elements in any digital data matrix or evenly spaced array along a given direction. Since the spacing between elements in one direction can be different from that between elements in the other, a complete matrix definition usually requires an expression of both data spacings. Also known as; sample spacing, grid spacing, grid interval, sampling interval, matrix interval.

DIGISMAC - digital scene matching area correlation - guidance technique of matching a digital reference scene to that obtained by sensors.

digital cultural data - 1. Man-made, natural and landscape features in a digital form. 2. Data in discrete digital (numerical) form including all man-made features on the earth's surface; e.g., lines of communication, built-up areas (cities), airfields, power transmission lines, landmark structures.

digital data - (ISO) Data represented by digits, perhaps with special characters and the space character.

digital data base (off-line) - A digital data base maintained in a common format that supports different user systems (e.g., simulator or weapon systems). Normally the data must be transformed before it can be used by a specific user system. This term is commonly expressed as the off-line data base.

digital data base (on-line) - A digital data base in the format needed by a user system (e.g., simulator or weapon system) and which can be directly loaded into the user system. This term is commonly referred to as the on-line data base.

digital feature analysis data (DFAD) - Data in discrete digital form concerning radar significant features.

Digital Landmass System (DLMS) Data Base - An off-line data base consisting of two basic types of digital data files (one containing terrain elevation data and one containing cultural and natural feature data) maintained by DMA to support various user systems (e.g., simulators and weapon systems). See DMA Product Specifications for Digital Landmass System (DLMS) Data Base, First Edition, July 1977.

digital map - 1. A map expressed and stored in digital form. 2. A representation in digital (numerical) form of discrete points on the earth's surface. Also called a numerical map.

Digital Radar Landmass Simulator (DRLMS) Data Base - An archaic term. The proper term is Digital Landmass System (DLMS) Data Base.

digital synthesized data - Data derived by the analysis of two or more different types of data such as digital terrain elevation data, digital natural feature data, and digital cultural data. An example is the derivation

of data which assesses the effects of soil types, vegetation, slope, drainage, and microrelief on cross-country movement of military vehicles.

digital synthetic data - Data in numerical format that describes either totally or partially fictitious information generated from lower resolution/ frequency input. Often referred to as synthetic data.

digital terrain analysis data (DTAD) - Data in discrete digital (numerical) form including vegetation, surface configuration, soils, inland hydrography, lines of communication, cross-country movement, probability of detection from the air, probability of detection from the ground (fields of fire), etc. See also digital synthesized data.

digital terrain data - A short form used to refer to digital terrain elevation data (DTED).

digital terrain elevation data (DTED) - Elevation posts in a digital form. See Defense Mapping Agency Product Specifications for DMA Standard for Digital Terrain Elevation Data, First Edition, October 1977.

digital terrain elevation matrix - Elevation posts, non-specific with respect to editing and smoothing, and evenly distributed in a rectangular pattern.

digital terrain model - A statistical representation of the continuous surface of the ground by a large number of selected points with known X, Y, Z coordinates in an arbitrary coordinate field.

elevation post - A point with a known horizontal and vertical position with respect to some defined reference system.

feature analysis - The process of locating, examining, and classifying the physical characteristics of cultural features on the earth's surface.

feature analysis code (FAC) number - A unique number (usually sequential) assigned to each area or feature portrayed on the feature manuscript and used to relate feature analysis data table (FADT) information to the digital information which portrays the shape of the feature.

feature analysis data table (FADT) - A table containing the feature analysis code numbers and the numeric codes which represent the physical characteristics of features selected for portrayal in the Digital Land Mass System (DLMS) Data Base.

feature identification data (FID) - Information pertaining to the classification of a feature as to kind, function and description (e.g., heavy fabrication industry with saw-tooth roof; truss bridge; powerline pylon, type H). Each classification has a unique three-digit feature identification code.

feature type - A classification of features into categories of point, linear (line), or areal features.

horizontal accuracy - A statement of the relative and/or absolute positional accuracy of a point computed in the plane formed by either the $\phi$ and $\lambda$ geographic components or the x and y grid components. Usually expressed in circular error (n%).

hydrographic digital data - Data in discrete numerical form derived from the measurements and description of the physical features of the oceans, seas, lakes, rivers, and other waters, and their adjoining coastal areas (with particular reference to navigational usage).

linear error - 1. A one-dimensional error (such as an error in elevation) defined by the normal distribution function. 2. Linear error is 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. For example, LT 90% is the term used to express the linear error at 90% probability, which is the Map Accuracy Standard.

linear feature - A feature that is portrayed by a line that does not represent an area. Also called line feature.

merge - 1. (ISO) To combine the items of two or more sets that are each in the same given order into one set in that order. 2. To combine two or more digital data files into one unit so that the individual data items are not distinguishable by the separating property.

pixel - Abbreviation for "picture element," the smallest element of single uniform transmission density of a photographic image.

planar - Digital data aligned to the UTM grid coordinate system. The data is digitized and stored by non-rectangular map sheet lines. This format is being replaced by the DMA standard format for digital terrain elevation data (DTED). See digital terrain elevation data (DTED).

point feature - An object whose location can be described by a single set of coordinates.

point to point accuracy - See relative accuracy.

post points - Common elevation posts between two different digital terrain files.

product data base - A data base organized to meet the specifications of a specific product.

relative accuracy - A numeric value representing the random errors in the distance between two points in a data base relative to each other. Any systematic errors present are not considered in the evaluation. Also called point to point accuracy.

TERCOM - An acronym for "Terrain Contour Matching."

terrain modeling - The mathematical modeling of the physical shape of a portion of the earth's surface (terrain) by fitting functions to the elevation data.

transformation program - 1. A computer program used to change digital data from one format to another (e.g., from planar to DMA standard). 2. Computer software which produces an on-line data base from an off-line data base.

verify - 1. To determine whether a transcription of data or other operation has been accomplished accurately. 2. To confirm the accuracy, portrayal, and completeness of digital data with respect to established standards or specifications.

vertical accuracy - A statement of the relative and/or absolute positional accuracy of a point computed along the line through that point normal to the geoid: i.e., the height or elevation components. Usually expressed in linear error (n%).

World Geodetic System (WGS) - A consistent set of parameters describing the size and shape of the Earth, the positions of a network of points 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).

DEFENSE MAPPING AGENCY
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OCT 14 1981

PR

SUBJECT: DMA List of Approved Products and Services - FY 1982

TO: See Distribution List

1. Enclosed is a List of Approved Products and Services available at DMA for FY 1982. This consolidated list is a basic reference for determining the various types of standard maps, charts, and related products and services that have been produced by DMA to support the Military Departments, U&S Commands, and the intelligence community. Complete area coverage and instructions for ordering these products and those of other producers from DMA are contained in applicable DMA Catalogs. DMA may also distribute additional nonstandard products not included in this list to meet new or special requirements identified by a user. As a new or special requirement is requested, DMA will determine if a nonstandard item is available for distribution.

2. The items in this list are shown as individual products or, in some cases, categories of products. As an example, the JOG-G is a single item; conversely, "Weather Plotting Charts" is a category and includes 109 individual items.

3. HQ DMA point of contact for the List of Approved Products and Services is Mr. David D. Fredlund, PRR, Autovon 294-4515/4478.

FOR THE DIRECTOR:

L. S. SEVERANCE, JR.
Rear Admiral, USN
Deputy Director for
Plans and Requirements

Enclosure a/s

Distribution List:

| | |
|---|---|
| JCS | 2 |
| DIA (ATTN: RDS-3C) | 30 |
| CSA (ATTN: DAMI-ISP) | 5 |
| CSAF (ATTN: AFIS/INT3) | 12 |
| USMC (INTM) | 5 |
| CNO (OP-952) | 2 |
| COMNAVOCEANCOM | 4 |
| NAVOCEANO | 4 |
| CINCAD | 5 |
| CINCMAC | 5 |
| CACDA (ATTN: ATCA-CCC-E) | 2 |

(Extracted)

| DMIS NO. | PRODUCT | DESCRIPTION/PURPOSE |
|---|---|---|
| | Weather Plotting Charts | |
| 1BA | Weather Plotting Charts Catalog (WPCC) | Provides a detailed listing and graphics of available items used to plot and forecast worldwide weather conditions including requisitioning procedures. |
| 1BA | Weather Plotting Charts (WPC) | These products are a variety of weather charts, scales, and diagrams used by DoD. |
| | Digital Aerospace Products | |
| 1CD | Digital Terrain Elevation Data - Level I (DTED I) | Provides wide area, medium scale coverage of terrain elevation data in DMA standard digital format. |
| 1CE | Digital Feature Analysis Data - Level I (DFAD I) | Provides wide area, medium scale coverage of planimetric features in DMA standard digital format. |
| 1CF | Digital Terrain Elevation Data - Level II (DTED II) | Provides small area, large scale coverage of terrain elevation data in DMA standard digital format. |
| 1CG | Digital Feature Analysis Data - Level II (DFAD II) | Provides small area, large scale coverage of planimetric features in DMA standard digital format. |
| 1CJ | Airborne Warning and Control System Data (AWACS) | Data tapes that provide landmass blanking input to RADAR sensors aboard AWACS aircraft operating in the maritime surveillance mode. The tapes consist of Digital Landmass Blanking (DLMB) data of shorelines in DMA standard format for $1^{o}$ cells, including shorelines for islands. |

culture

| DMIS NO. | PRODUCT | DESCRIPTION/PURPOSE |
|---|---|---|
| 1FF | Special Weapons Overflight Guide (SWOG) | This is a classified TOP SECRET document produced as a companion product to the Foreign Clearance Guide. |
| | Aeronautical Publications and Services | |
| 1GA | Airfields and Seaplane Stations of the World (ASSOTW) | Provides graphic and textual information on operational status and physical characteristics of airfields on a worldwide basis. By-product of evaluated data contained in the AAFIF (1GE). |
| 1GB | DMA Catalog of Maps, Charts, and Related Products, Part I - Aerospace Products. Volume I - Aeronautical Charts, Flight Information Publications, and Related Products. Volume II - Weather Plotting Charts. (ACFPC) | Provides a detailed listing of available unclassified aeronautical charts, flight information publications and requisitioning procedures. |
| 1GB | DMA Special Supplement to Catalog of Aeronautical Charts, Bulletin/Digest, and CHUM | Provides an index and is the Bulletin/Digest and Chart Updating Manual for CONFIDENTIAL aeronautical charts. |
| 1GB | Chart Updating Manual (CHUM) | Provides chart corrective information that is potentially hazardous to flight. |
| ★ 1GB | Catalog of Digital Data Products | Portrays the areas of coverage of the various levels of digital data retained by DMA in the Cartographic Data Base. |
| 1GE | Automated Air Facilities Information File (AAFIF) | Provides operational status and physical characteristics of free world airfields and related aeronautical support facilities to support production of DoD MC&G products and to assist DoD operational and contingency planners. |
| 1GK | DMA Vertical Obstruction File (D-VOF) | Supports aeronautical charting and special requests by DoD users for vertical obstruction data. |

Cruise Missile

| DMIS NO. | PRODUCT | DESCRIPTION/PURPOSE |
|---|---|---|
| 2EH | Azimuths of Celestial Bodies - Pub 261 | Provides a method of determining gyro and magnetic compass error from celestial bodies with declinations from 24 degrees to 70 degrees. |
| 2EH | Technical Publications (TRPUB) | Provides manual of technical information on collection of corrected cartographic data, application of data to chart construction, and similar publications for limited distribution. |
| 2EH | American Practical Navigator Pub 9, Volumes I and II | Volume I - A compendium of navigational material that provides comprehensive methods and practices of marine navigation for training and reference purposes. Volume II - Tables with related text required for solution of navigation problems. |
| 2EH | Maneuvering Board Manual - Pub 217 | A quick basic reference to specific problem solutions for vessels engaged in naval tactical maneuvers. |
| 2EH | Handbook of Magnetic Compass Adjustment - Pub 226 | Details techniques and theory of proper adjustment of shipboard magnetic compasses. |
| 2EH | Radar Navigation Manual - Pub 1310 | Provides referral to various radar navigation techniques and radar information needed in performance of ship navigation. |
| 2EH | Manual of Procedures for General Bathymetric Navigation (SP-42A) | Gives basic procedures for utilization of various bathymetric products by the Navy navigator. |
| | Digital Hydrographic Data and Products | |
| 2GC | Digital Data for Radar Navigation Simulation | Provides terrain, cultural, and hydrographic data in digital form to support training devices. |

| DMIS NO. | PRODUCT | DESCRIPTION/PURPOSE |
|---|---|---|
| 4BB | Short-Range Attack Missile (SRAM) Support (RFP) (service only; no specifications) | Geodetic coordinates and elevation data of radar significant checkpoint fixes derived and provided to SAC. These Radar Fix Points (RFP) are used in the alignment of the inertial navigation system in the airborne delivery of the SRAM. |
| 4BC | Tactical Target Data (service only; no specifications) | Precise data derived from point positioning data bases or other sources on a rapid response basis to support tactical operations using tactical aircraft equipped with advanced airborne radar or LORAN navigation systems. |
| | SAC Mission Planning Support | |
| 4CB | JCS-ONC Low-Level Planning Charts (JCS/O) 1:1,000,000 | ONC base charts with special SAC SIOP Low-Level Intelligence, Mini-Bloc and Planning Overprints. |
| 4CB | JCS-JNC (JCS/J) 1:2,000,000 | JNC Base charts with a special SAC intelligence overprint. |
| 4CB | SAC Special Domestic JNC 1:2,000,000 (printing service only) | These charts are produced with a special SAC RFP overprint used for domestic training by SAC manned bomber forces. |
| | Aerospace/Land Combat Point Positioning Data Bases | |
| 4DA | Deployable Point Positioning Data Base (PPDB) | Sets of geodetically controlled photographs and accompanying data that enable trained personnel using appropriate hardware and software to derive accurate coordinates for any feature. Primarily used for tactical point positioning in the field. |
| 4DC | DoD Catalog of Point Positioning Data Bases | Provides a detailed listing regarding area of coverage and the accuracy of deployable point positioning data bases prepared by DMA. |

| DMS NO. | PRODUCT | DESCRIPTION/PURPOSE |
|---|---|---|
| | Special Support | |
| 4EA | IROL Positional Data (service only; no specifications) | Coordinates related to the World Geodetic System (WGS) of high resolution objectives contained in the Imagery Reconnaissance Objective List (IROL). This positional data supports the Imagery Reconnaissance Objective Program (IROP). |
| | Geodetic and Geophysical Support to Weapon Systems | |
| 4F | Geodetic Surveys, Studies and Other Services | Performs geodetic surveys and studies to support DoD and DoD contractor activities. |
| | Digital Data Support for Missile Guidance | |
| 4GD | Vertical Obstruction Data (VOD) | Vertical obstruction data required to support the cruise missile mission planning system (ALCM, GLCM, SLCM). |
| 4GE<br>4GF<br>4GG | TERCOM Maps | Rectangular arrays of digital terrain elevation data at predetermined intervals, sizes, and orientations validated to support navigation through Terrain Contour Matching (TERCOM). |

PS/1C/100
PS/3E/600

# DEFENSE MAPPING AGENCY PRODUCT SPECIFICATIONS FOR DMA STANDARD FOR DIGITAL TERRAIN ELEVATION DATA

FIRST EDITION
OCTOBER 1977

## (Extracted)

# SECTION 100 - INTRODUCTION

## 101. General

A. Data Derivation. These specifications deal primarily with the derivation of terrain elevation data from various cartographic and photographic sources. Terrain data is derived utilizing various techniques and, other than to define the contents of the terrain file, is not addressed in this section.

B. Terrain Data Interval. Elevation information in DMA standard digital format can be in any interval, however, it must conform to the constraints in Section 200, paragraph 202.B.4.C.

## 102. Datums

A. Vertical: Terrain. The vertical datum for terrain elevation data is Mean Sea Level.

B. Horizontal: Terrain. The horizontal datum for terrain elevation data is the World Geodetic System (WGS).

## 103. Accuracy Requirements - Terrain Files

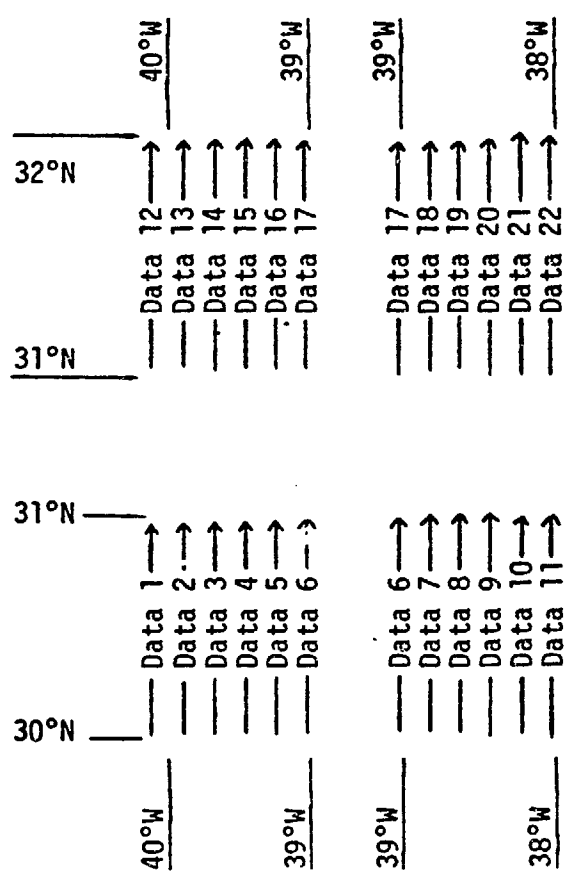
The horizontal and vertical accuracy requirements for the terrain files are as follows (note: LE = Linear Error; CE = Circular Error):

| | Absolute | Relative |
|---|---|---|
| Vertical | LE 90% MSL<br>± __ meters (± feet) | LE 90% (Point to Point)<br>± __ meters (± __ feet) |
| Horizontal | CE 90% WGS<br>__ meters (__ feet) | |

PS/1C/100
PS/3E/600

DMA STANDARD TERRAIN EXAMPLE
FOUR 1° SQUARES
12' LONGITUDE SPACING

| RECORD SEQUENCE | RECORD TYPE | |
|---|---|---|
| 1 | VOL 1 | |
| 2 | HDR 1 | |
| 3 | UHL 1 | 30°N,40°W |
| 4 | * | |
| 5 | Data 1 | |
| 6 | Data 2 | |
| 7 | Data 3 | |
| 8 | Data 4 | |
| 9 | Data 5 | |
| 10 | Data 6 | |
| 11 | * | |
| 12 | EOF 1 | |
| 13 | UTL 1 | |
| 14 | * | |
| 15 | HDR 1 | |
| 16 | UHL 1 | 30°N,39°W |
| 17 | * | |
| 18 | Data 6 | |
| 19 | Data 7 | |
| 20 | Data 8 | |
| 21 | Data 9 | |
| 22 | Data 10 | |
| 23 | Data 11 | |
| 24 | * | |
| 25 | EOF 1 | |
| 26 | UTL 1 | |
| 27 | * | |
| 28 | HDR 1 | |
| 29 | UHL 1 | 31°N,40°W |
| 30 | * | |
| 31 | Data 12 | |
| 32 | Data 13 | |
| 33 | Data 14 | |
| 34 | Data 15 | |
| 35 | Data 16 | |
| 36 | Data 17 | |
| 37 | * | |
| 38 | EOF 1 | |
| 39 | UTL 1 | |
| 40 | * | |
| 41 | HDR 1 | |
| 42 | UHL 1 | 31°N,39°W |
| 43 | * | |
| 44 | Data 17 | |
| 45 | Data 18 | |
| 46 | Data 19 | |
| 47 | Data 20 | |
| 48 | Data 21 | |
| 49 | Data 22 | |
| 50 | * | |
| 51 | EOF 1 | |
| 52 | UTL 1 | |
| 53 | * | |
| 54 | * | |



PS/ICD/100
PS/ICE/100
PS/ICF/100
PS/ICG/100

DEFENSE MAPPING AGENCY

# PRODUCT SPECIFICATIONS for DIGITAL LANDMASS SYSTEM (DLMS) DATA BASE

FIRST EDITION
JULY 1977

(Extracted)



STOCK NO. SPECXDLMS

# CHAPTER 1 -- INTRODUCTION
## SECTION 100 -- GENERAL

| Paragraph | | Page |
|---|---|---|
| 101 | Data Derivation | 1 |
| 102 | Data Density Levels | 1 |

### 101. Data Derivation

These specifications deal primarily with the derivation of cultural data from various planimetric, photographic, and intelligence sources. This data is utilized to produce a culture manuscript which, along with appropriate descriptive information, is converted to digital form for inclusion in the final culture file. Terrain data is derived utilizing various techniques, and, other than to define the contents of the terrain file, is not addressed in this section.

### 102. Data Density Levels

A. The content of both files of the Digital Landmass System (DLMS) Data Base is collected at two different levels which are defined and identified as follows:

1. Level 1

a. Terrain: Relief information to DMA standard digital format on a three seconds of latitude arc (approximately 100 meters (300 feet)) matrix. (Refer to Table 1-100-1.)

b. Culture: A generalized description and portrayal, in DMA standard digital format, of planimetric features. The Level 1 data base is intended to cover large expanses of the earth's surface and has relatively large minimum size requirements for portrayal of planimetric features.

2. Level 2

a. Terrain: Relief information in DMA standard digital format on a one second of latitude arc (approximately 30 meters (100 feet)) matrix. (Refer to Table 1-100-1.)

b. Culture: A highly detailed description and portrayal, in DMA standard digital format, of planimetric features. The Level 2 data base is intended to cover small areas of interest and has small minimum size requirements for portrayal of planimetric features.

B. Terrain Data Interval

Elevation information will be in DMA standard digital format (refer to Chapter Four, Section 100) at various intervals depending on the zone/latitude as indicated in the following table:

| Zone | Latitude | Level 1 lat. long. | Level 2 lat. long. |
|---|---|---|---|
| I | $0^{\circ}$-$50^{\circ}$ N-S | 3 x 3 seconds | 1 x 1 second |
| II | $50^{\circ}$-$70^{\circ}$ N-S | 3 x 6 seconds | 1 x 2 seconds |
| III | $70^{\circ}$-$75^{\circ}$ N-S | 3 x 9 seconds | 1 x 3 seconds |
| IV | $75^{\circ}$-$80^{\circ}$ N-S | 3 x 12 seconds | 1 x 4 seconds |
| V | $80^{\circ}$-$90^{\circ}$ N-S | 3 x 18 seconds | 1 x 6 seconds |

NOTE: All values in seconds are in terms of arc measure.

Table 1-100-1 - Terrain Data Interval

# CHAPTER 1 -- INTRODUCTION
## SECTION 300 — ACCURACY REQUIREMENTS


| Paragraph | | Page |
|---|---|---|
| 301 | General | 5 |
| 302 | Terrain File | 5 |
| 303 | Culture File | 5 |
| 304 | Heighting Accuracy | 5 |


### 301. General

The stated accuracies in this section specify an objective for the DLMS Data Base and are based on known product requirements. The terrain and culture files will be compatible. Compatibility is the horizontal positional relationship which insures that features on the culture files will coincide with the proper terrain elevation locations, e.g., rivers in river valleys, bridges crossing valleys, obstructions correctly located.

NOTE: L.E. = Linear Error
C.E. = Circular Error

### 302. Terrain Files

The absolute accuracy objectives for the terrain data are:

| | Horizontal | Vertical |
|---|---|---|
| Level 1 | 130 meters (425 ft)<br>C.E. 90% WGS | ±30 meters (±100 ft)<br>L.E. 90% MSL |

Level 2*

* Coordinates and elevation values of Level 2 terrain data are equivalent to Level 1 terrain data at the common posts.

### 303. Culture File

A. The absolute horizontal accuracy objective for Level 1 culture data is 130 meters (425 feet), C.E. 90% WGS. Level 2 culture data will be compatible with Level 1 feature detail and has a 26 meter (85 foot) relative accuracy (point-to-point) at 90% C.E.

B. Vertical accuracy for cultural data is not applicable. For obstructions over 46 meters (150 feet) see paragraph 304.

### 304. Heighting Accuracy

The heighting accuracy requirement for vertical obstructions which are 46 meters (150 feet) or greater is ±10 meters (±30 feet) (90% assurance above ground level).

# CHAPTER -- ANALYSIS
## SECTION 100 -- SURFACE MATERIAL CATEGORY (SMC)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### 101. General

A. Feature analysis is designed to determine what the physical characteristics of a feature are and which features will be selected for portrayal (areal, line, or point) on the feature manuscript. The selection of features to be portrayed is based upon those factors which are outlined in the following specifications. These factors include such considerations as size, predominant height and surface material makeup. This information is determined by analyzing aerial and ground photography, map source, textual materials and intelligence reports.

B. All surface groups shall be divided into generally homogeneous surface material groupings, depending on the predominant exposed surface material, in accordance with the categories listed in this section. If a homogeneous surface material grouping is too small to be considered separately, it will be included in the surrounding grouping or in the most closely related adjoining grouping.

C. Each homogeneous surface material grouping that meets the minimum requirements shall be delineated on the feature manuscript and identified by a surface material code in the data table. Refer to Chapter Three, Section 200, for additional descriptive information requirements.

D. The surface material criteria also applies to all areal, line and point features in accordance with the specification requirements (Chapter Two, Section 400).

E. For examples of analysis treatment refer to Appendix IV, Symbols.

NOTE: The format of the DMLS culture file requires that the dimensions of planimetric features be recorded in 2 meter increments. In some cases these specifications state size requirements in odd meters (e.g., 3 meters (10 feet)). It should be noted that these requirements are the minimum criteria for selection only, and are stated in odd increments to more closely approximate the corresponding foot values. Unless standardized by these specifications, the recorded dimensions for all planimetric features shall be rounded off to the nearest 2 meter or 5 foot increment. Two meters or five feet is the minimum unit of measure to be recorded for any feature. If any actual dimension of a feature selected for portrayal is less than this minimum, the dimension shall be recorded on the Feature Analysis Data Table as 2 meters or 5 feet.

102. Surface Material Category 1 (Metal)

Criteria -- 75% or more of the surface material is metal, for example, tin, steel, corrugated iron, aluminum, etc. Surface material includes the roof area but excludes ground and ground level pavements.

NOTE: This category includes features of all types that are predominantly constructed of metal. It may include, but is not limited to, such features as aluminum mobile homes, steel storage tanks, steel bridge super/sub-structures, steel power transmission towers, etc.

103. Surface Material Category 2 (Part Metal)

Criteria -- 40% to 74% of the surface material is metal, the remaining surface material being some other material, such as wood, stone, brick, concrete, etc. Surface material includes roof area but excludes ground and ground level pavements.

NOTE: This category includes (but is not limited to) such features as railroad yards and metal ore slag dumps.

| Surface Material Category Size Requirements | | | | | SMC Change Requirements* | | Height Differential Requirements | | | Rules |
|---|---|---|---|---|---|---|---|---|---|---|
| SMC | Min. Length | Min. Width | Min Height | Min. Roof Cover | Min. Length | Min. Width | Min. Height Diff. | Min. Length | Min. Width | Note |
| 1 | 30(100) | 30(100) | 3(10) | 6% | 15(50) | ANY | NOT REQUIRED | | | 1,5,6,8 |
| 2 | 30(100) | 30(100) | 3(10) | 6% | 15(50) | ANY | NOT REQUIRED | | | 2,5,6,8 |
| 3 | 30(100) | 30(100) | 5(15) | 6% | 60(200) | 60(200) | 10(30) | 30(100) | ANY | 5,8 |
| 4 | 60(200) | 60(200) | 5(15) | 6% | 60(200) | 60(200) | 10(30) | 60(200) | ANY | 5,8 |
| 5 | 30(100) | 30(100) | 5(15) | -- | -- | -- | -- | -- | -- | -- |
| 6 | 30(100) | 30(100) | -- | -- | -- | -- | -- | -- | -- | 4,5,7 |
| 7 | 600(2000) | 150(500) | -- | -- | -- | -- | -- | -- | -- | 9,12 |
| 8 | 150(500) | 150(500) | -- | -- | -- | -- | -- | -- | -- | -- |
| 9 | 100(300) | 100(300) | -- | -- | -- | -- | -- | -- | -- | 3,5,10 |
| 10 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3,5 |
| 11 | 150(500) | 150(500) | -- | -- | -- | -- | -- | -- | -- | -- |
| 12 | 60(200) | 10(30) | 8(25) | -- | -- | -- | -- | -- | -- | 3,5,11 |
| 13 | 150(500) | 150(500) | -- | -- | -- | -- | -- | -- | -- | -- |

TABLE 2-100/200-2 LEVEL 2 - SURFACE/HEIGHT SPECIFICATIONS
(Dimensions in Meters (Feet))

*SMC change within other surface material areas (urban areas) 1-4

Refer to pages 23 and 25 for notes.

## NOTES FOR TABLES 2-100/200-1 AND 2-100/200-2

NOTE: (1) Height differential grouping is not required within an SMC 1 area. SMC change not required for SMC 1 areas within an SMC 2 area.

(2) Height differential grouping not required within an SMC 2 area. SMC change is not required for SMC 2 areas within an SMC 1 area.

* (3) All open areas within an urban area (SMC 1-4) will be described as SMC 9, SMC 10 or SMC 12 depending upon its predominant content. Minimum size requirements 150m x 150m (500'x500') Level 1, 60m x 60m (200'x200') Level 2. All of the land area on the manuscript will be described as SMC 10 (soil) for the background material. Open areas within urban areas are defined as areas having 5% or less roof coverage and surrounded by SMC 1, 2, 3 or 4 buildings.

* (4) To minimize the fragmentation of rivers, those narrower sections between SMC 6 river segments (areal portrayal) that are at least 100 meters (300 ft) wide at Level 1, or at least 20 meters (66 ft) at Level 2, shall be portrayed as linear features. Length and width measurements for inland water areas shall be made at the normal water level. Tidal water area measurements shall be made at mean high water. (NOTE: See Unique Significant Features for details of mud/tidal flats.)

(5) Open areas within wooded areas will be described as SMC 10 (soil). Minimum size requirements of open areas are 300m x 300m (1000'x1000') Level 1 and 60m x 60m (200'x200') Level 2. Open areas within wooded areas are defined as areas having less than 51% trees and less than 5% buildings. SMC 1 through 4 and 6 areas may be shown within a wooded area if applicable surface/height specifications are met. The above minimum size requirements will also apply to SMC 10 areas falling within SMC 8, 9, 11 and/or 13 areas.

(6) Surface material or height differential groupings (areas) smaller than 150m x 150m (500'x500') Level 1 or 30m x 30m (100'x100') Level 2 shall be portrayed as a point or line feature.

| Surface Material Category Size Requirements | | | | | SMC Change Requirements* | | Height Differential Requirements | | | Rules |
|---|---|---|---|---|---|---|---|---|---|---|
| SMC | Min. Length | Min. Width | Min Height | Min. Roof Cover | Min. Length | Min. Width | Min. Height Diff. | Min. Length | Min. Width | Note |
| 1 | 150(500) | 150(500) | 3(10) | 6% | 90(300) | ANY | NOT REQUIRED | | | 1,5,6,8 |
| 2 | 150(500) | 150(500) | 3(10) | 6% | 90(300) | ANY | NOT REQUIRED | | | 2,5,6,8 |
| 3 | 150(500) | 150(500) | 5(15) | 6% | 300(1000) | 300(1000) | 10(30) | 150(500) | ANY | 5,8 |
| 4 | 300(1000) | 300(1000) | 5(15) | 6% | 600(2000) | 600(2000) | 10(30) | 600(2000) | ANY | 5,8 |
| 5 | 300(1000) | 300(1000) | 5(15) | -- | -- | -- | -- | -- | -- | -- |
| 6 | 150(500) | 150(500) | -- | -- | -- | -- | -- | -- | -- | 4,5,7 |
| 7 | 1800(6000) | 300(1000) | -- | -- | -- | -- | -- | -- | -- | 9,12 |
| 8 | 600(2000) | 600(2000) | -- | -- | -- | -- | -- | -- | -- | -- |
| 9 | 300(1000) | 300(1000) | -- | -- | -- | -- | -- | -- | -- | 3,5,10 |
| 10 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3,5 |
| 11 | 300(1000) | 300(1000) | -- | -- | -- | -- | -- | -- | -- | -- |
| 12 | 300(1000) | 30(100) | 8(25) | -- | -- | -- | -- | -- | -- | 3,5,11 |
| 13 | 600(2000) | 600(2000) | -- | -- | -- | -- | -- | -- | -- | -- |

TABLE 2-100/200-1 LEVEL 1 - SURFACE/HEIGHT SPECIFICATIONS
(Dimensions in Meters (Feet))

*SMC change within other surface material areas (urban areas) 1-4

Refer to pages 23 and 25 for notes.

NOTES FOR TABLES 2-100/200-1 AND 2-100/200-2 (CONT'D)

(7) Features that are surrounded by or cross water areas are of particular importance. Refer to the Unique Feature Specifications for minimum size requirements of such features as causeways, islands and bridges. Bodies of water will not be grouped together to meet the areal specification requirements for SMC 6 areas.

(8) The minimum width of 2 meters or 5 feet will be recorded on the FADT even if the actual width is less than 2 meters or 5 feet. Two meters or five feet is the minimum unit of measure to be recorded for any feature.

(9) The minimum size requirements refer to mud/tidal flats.

(10) Refer to Unique Feature Specifications, Chapter 2, Section 400, for airfield runway and taxiways minimum size requirements.

(11) Recorded tree height is standardized at 16 meters or 50 feet for trees less than 30 meters (100 feet) tall, and at 30 meters (100 feet) for trees taller than 30 meters (100 feet).

(12) This note pertains to sand dunes. The minimum size requirements are:

Level 1: Length and width = 3000 meters (10,000 feet)
Level 2: Length and width = 600 meters ( 2,000 feet)

Portrayal of desert or sand areas other than sand dunes, sand bars or mud/tidal flats is not required.

# CHAPTER 2 -- ANALYSIS
## SECTION 400 -- UNIQUE SIGNIFICANT FEATURES


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| | 433 | Airfield Navigation Aids | 43 |
| | 434 | Transformer Yards | 44 |
| | 435 | Special Tall Buildings | 44 |
| * | 436 | Electrified Railroad Gantries/Pylons | 44a |

## 401. General

Unique significant features are selected in accordance with the size criteria given in Tables 2-400-1 and 2-400-2 in this section, under individual headings. Unique significant features are defined as features that are significant but which do not meet the minimum dimensions of a homogeneous surface material grouping. The selection of features is based upon those factors which are outlined in the specification table. These factors include such considerations as type of feature, surface material makeup, predominant height, and minimum dimension requirements.

## 402. Selection and Portrayal

A. Unique features that meet the minimum specifications will be delineated as areal, point or line features on the feature manuscript. Unless otherwise specified descriptive information will be recorded in the data table in accordance with feature analysis data table specifications (Chapter 3, Section 200). This information is determined by analyzing aerial and ground photography and other miscellaneous sources.

B. In areas of congested detail, a representative pattern of features reflecting the actual shape and configuration of the areas will be selected for portrayal. Where two linear features are too close together to be portrayed separately at compilation scale, the feature with predominant characteristics (normally SMC) will be selected for portrayal (i.e., a wall adjacent to an embankment). In areas where point features are too close together to be portrayed separately at compilation scale, the features with predominant reflective characteristics will be selected for portrayal. Exception: If two features occupy the same position, i.e., tower on top of building or tower beside building, and the total height exceeds 46 meters (150 feet) above the terrain, the portrayal will reflect the overall height and description of the tallest or uppermost feature.

C. A representative pattern of identical features will be selected for portrayal when they are too congested for separate portrayal.

D. In very flat or sparse areas, minor detail assumes much greater significance than in rolling or hilly terrain, or areas of dense culture. Additional features may be included below the basic specification sizes in these circumstances. For example, in flat areas a representative pattern of linear features will be delineated on the feature manuscript. (Refer to Regional Features, paragraph 427 for additional guidance.)

All features will be portrayed as the type shown (areal, line, point) with the exception of those followed by an asterisk, which may be reassigned as appropriate.

| TYPE | SURFACE MATERIAL CATEGORY | MIN. LENGTH | MIN. WIDTH | MIN. HEIGHT | NOTES |
|---|---|---|---|---|---|
| **Areal** | | | | | |
| Railroad Yards, Spurs, Sidings* | 2 | 300(1000) | 5 TRACK | ANY | 2 |
| Parking Aprons, Areas | 9 | 300(1000) | 300(1000) | ANY | 2 |
| Metal Ore Slag Dumps | 2 | 150(500) | 150(500) | 3(10) | |
| Islands * | 10,3 | ANY | ANY | ANY | 2,5 |
| Storage Areas | 1-5 | 150(500) | 150(500) | ANY | 8 |
| Mud/Tidal Flats | 7 | 1800(6000) | 300(1000) | ANY | 2 |
| Stripmines | 5 | 600(2000) | 600(2000) | 5(15) | |
| Quarries * | 3 | 300(1000) | 300(1000) | -10(-30) | 9 |
| **Linear** | | | | | |
| Bridges | 1,2,3 | 150(500) | ANY | ANY | 1 |
| Elevated Road or Railroad | 1,2,3 | 600(2000) | ANY | 5(15) | 1 |
| Causeways | 5 | 150(500) | ANY | ANY | 1 |
| Embankments/Cuttings | 5 | 300(1000) | ANY | ± 5(15) | 1 |
| Fences | | NOT REQUIRED | | | |
| Walls | 1,2,3 | 300(1000) | ANY | 3(10) | 1 |
| Dams/Weirs | 3 | 150(500) | ANY | 5(15) | 1 |
| | 5 | 300(1000) | ANY | 5(15) | 1 |
| Airfield Runways/Taxiways | 9 | 1000(3000) | 30(100) | ANY | 2 |
| Wharves/Piers | 2 | 150(500) | ANY | 3(10) | 1 |
| Breakwaters/Jetties | 3 | 300(1000) | ANY | ANY | 1,3 |
| Cliffs/Waterfall | 3 | 300(1000) | ANY | 30(100) | 2,3 |
| Locks | | NOT REQUIRED | | | |
| Regional Features | 5,12 | 600(2000) | ANY | ANY | 2,3 |
| Pipelines | 2 | 600(2000) | ANY | ANY | 1 |
| **Point** | | | | | |
| Obstructions | 1,2,3,4 | ANY | ANY | 15(50) | 1,11,10 |
| Isolated Structures * | 1,2,3 | 30(100) | ANY | 3(10) | 1,7,12,13 |
| Radar Reflectors | 1 | ANY | ANY | ANY | 1,6 |
| Airfield Navigation Aids | | NOT REQUIRED | | | |
| Transformer Yards * | 1 | 30(100) | ANY | 5(15) | 1 |
| Special Tall Buildings * | 1,2,3,4 | 30(100) | ANY | 15(50) | 1,4,10 |
| Electrified RR Gantries/Pylons | 1 | 8(25) | ANY | 10(30) | |

TABLE 2-400-1 LEVEL 1 UNIQUE FEATURE SPECIFICATIONS
(Dimensions in Meters (Feet))

REFER TO PAGE 49 FOR NOTES

All features will be portrayed as the type shown (areal, line, point) (including air field runways, bridges, etc. which may exceed the maximum width permitted for linear features) with the exception of those followed by an asterisk which may be reassigned as appropriate.

| TYPE | SURFACE MATERIAL CATEGORY | MIN. LENGTH | MIN. WIDTH | MIN. HEIGHT | NOTES |
|---|---|---|---|---|---|
| Areal | | | | | |
| Railroad Yards, Spurs, Sidings* | 2 | 300(1000) | 5 TRACK | ANY | 2 |
| Parking Aprons, Areas | 9 | 100(300) | 100(300) | ANY | 2 |
| Metal Ore Slag Dumps | 2 | 30(100) | 30(100) | 3(10) | |
| Islands * | 10,3 | ANY | ANY | ANY | 2,5 |
| Storage Areas | 1-5 | 30(100) | 30(100) | ANY | 8 |
| Mud/Tidal Flats | 7 | 600(2000) | 150(500) | ANY | 2 |
| Stripmines | 5 | 300(1000) | 300(1000) | 5(15) | |
| Quarries * | 3 | 150(500) | 150(500) | -10(-30) | 9 |
| Linear | | | | | |
| Bridges | 1,2,3 | 30(100) | ANY | ANY | 1 |
| Elevated Road or Railroad | 1,2,3 | 300(1000) | ANY | 5(15) | 1 |
| Causeways | 5 | 30(100) | ANY | ANY | 1 |
| Embankments/Cuttings | 5 | 100(300) | ANY | ± 5(15) | 1 |
| Fences | 1 | 150(500) | ANY | 3(10) | 1,6 |
| Walls | 1,2,3 | 150(500) | ANY | 3(10) | 1 |
| Dams/Weirs | 3 | 30(100) | ANY | 3(10) | 1 |
| | 5 | 100(300) | ANY | 3(10) | 1 |
| Airfield Runways/Taxiways | 9 | 300(1000) | 15(50) | ANY | 2 |
| Wharves/Piers | 2 | 30(100) | ANY | 3(10) | 1 |
| Breakwaters/Jetties | 3 | 100(300) | ANY | ANY | 1,3 |
| Cliffs/Waterfall | 3 | 100(300) | ANY | 10(30) | 2,3 |
| Locks * | 3 | 30(100) | ANY | 3(10) | 2,3 |
| Regional Features | 5,12 | 100(300) | ANY | ANY | 2,3 |
| Pipelines | 2 | 100(300) | ANY | ANY | 1 |
| Point | | | | | |
| Obstructions | 1,2,3,4 | ANY | ANY | 15(50) | 1,11,10 |
| Isolated Structures * | 1,2,3 | 10(30) | ANY | 3(10) | 1,7,13 |
| Radar Reflectors | 1 | ANY | ANY | ANY | 1,6 |
| Airfield Navigation Aids | 1,2,3 | ANY | ANY | ANY | 1,6 |
| Transformer Yards * | 1 | 15(50) | ANY | 3(10) | |
| Special Tall Buildings * | 1,2,3,4 | 15(50) | ANY | 15(50) | 1,4,10 |
| Electrified RR Gantries/Pylons | 1 | 8(25) | ANY | 10(30) | |

TABLE 2-400-2 LEVEL 2 UNIQUE FEATURE SPECIFICATIONS
(Dimensions in Meters (Feet))

REFER TO PAGE 49 FOR NOTES

## NOTES FOR TABLES 2-400-1 AND 2-400-2

NOTES:

1. Show minimum of 2m (5 ft) in FADT.
2. Recorded height is standardized.
3. Recorded width is standardized.
4. Height is above surrounding homogeneous area.
5. Height is required if shown as a point or line feature.
6. Information relative to these features will often require reference to supplementary sources.
7. Minimum height for isolated structures SMC 3 is 5m (15 feet).
8. Minimum height for SMC 5 areas is 5 meters (15 feet).
9. The recorded height for linear portrayal is standardized as zero.
10. * SMC 4 structures must be 46 meters (150 feet) above ground.
11. * Standard description (length = 6 meters (20 feet), width = 6 meters (20 feet), height = 24 meters (80 feet), orientation = 360°) shall be applied to all lattice type obstructions that are less than 46 meters (150 feet) in height except electrified railroad pylons/gantries.
12. * The description for isolated farmhouses and groups of agricultural buildings of SMC 3 material will be standardized as: Length and Width = 44 meters (approximately 150 ft); Height = 8 meters (25 ft); Orientation = 360°; Feature Identification Code Number = 430.
13. Selection criteria also applies to structures within a rail yard.

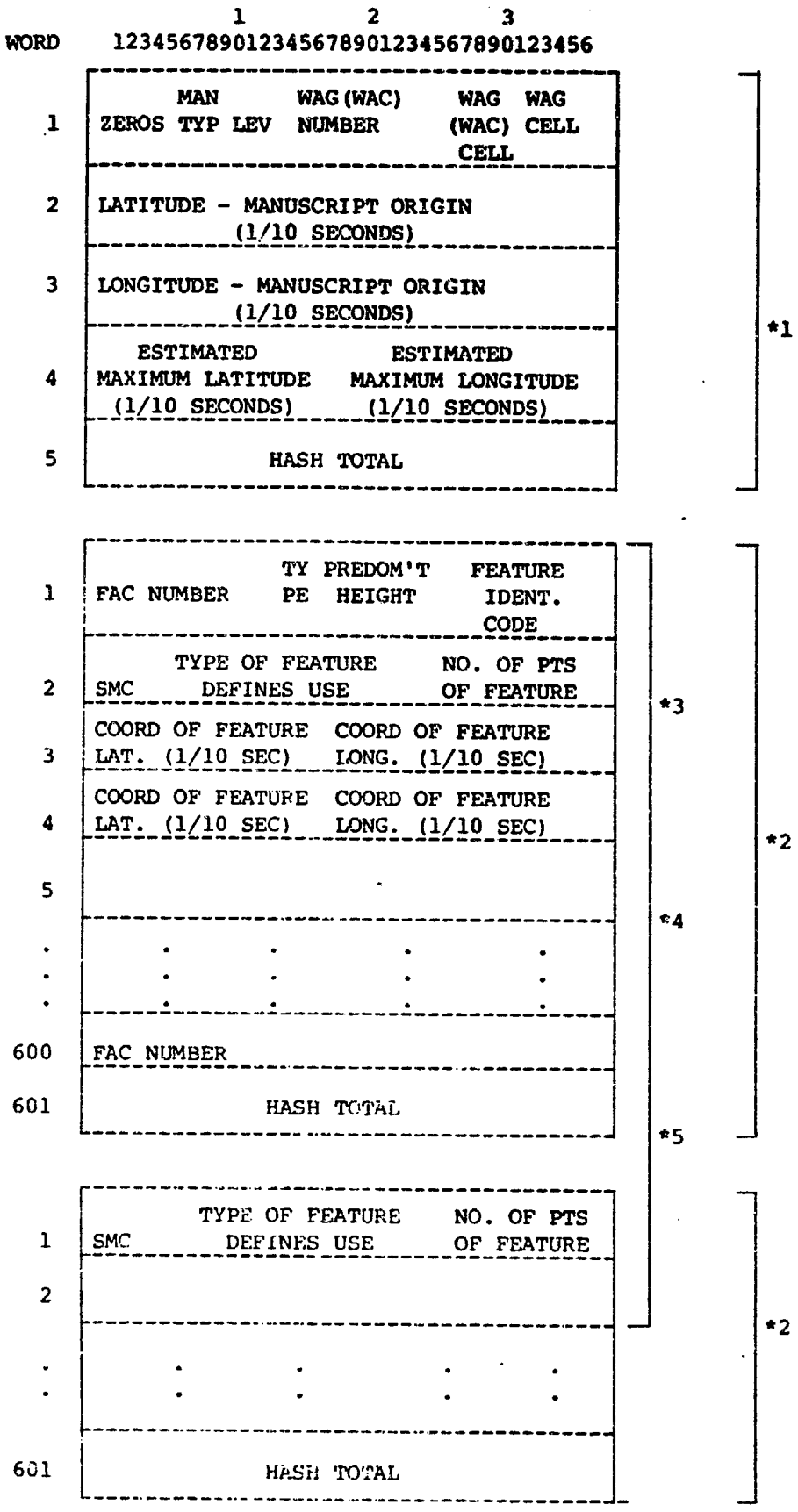


TABLE 4-200-1 CULTURE RECORD DESCRIPTION

| INDUSTRIAL FEATURES | | | SAMPLE DESCRIPTION | | | | | | | | | | | | SPECIFICATIONS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FEATURE NAME (Title) | MAP SYMBOL | DLMS SYMBOL | FAC No. | Feat. Type | SMC | Height | No. Strs | % Trees | % Root | F.I.D. | Orient./ Direct. | Length/ Diam. | Width | Level | Minimum Selection Criteria L | W | H | SMC | RULES/NOTES |
| Quarry | | 15 | 15 | 2 | 3 | -10m (-30) | 0 | 0 | 0 | 102 | | | | 1 | 300m (1000) | 300m (1000) | -10m (-30) | 3 | Height is measured from the deepest part of the quarry<br>Height shall be shown as a negative value. |
| | | | 15 | 2 | 3 | -10m (-30) | 0 | 0 | 0 | 102 | | | | 2 | 150m (500) | 150m (500) | -10m (-30) | | |
| | | 16 | 16 | 1 | 3 | 0 | | | | 102 | 001 | | 2m (5) | 1 | 300m (1000) | 2m (5) | -10m (-30) | 3 | Height is standard. |
| | | | 16 | 1 | 3 | 0 | | | | 102 | 001 | | 2m (5) | 2 | 150m (500) | 2m (5) | -10m (-30) | | |
| Gas/Oil Derrick | | 15 | 15 | 0 | 1 | 24m (80) | | | | 103 | 360 | 6m (20) | 6m (20) | 1 | ANY | ANY | 15m (50) | 1, 2 or 3 | Dimensions are standard<br>When height exceeds 46m (150 ft.) record actual dimensions.<br>Orientation is 360 |
| | | | 15 | 0 | 1 | 24m (80) | | | | 103 | 360 | 6m (20) | 6m (20) | 2 | ANY | ANY | 15m (50) | | |
| Offshore Platform (with derrick) | | 15 | 15 | 0 | 1 | 24m (80) | | | | 105 | 360 | 6m (20) | 6m (20) | 1 | ANY | ANY | 15m (50) | 1, 2 or 3 | Dimensions are standard.<br>When height exceeds 46m (150 ft.) record actual dimensions.<br>Orientation is 360 . |
| | | | 15 | 0 | 1 | 24m (80) | | | | 105 | 360 | 6m (20) | 6m (20) | 2 | ANY | ANY | 15m (50) | | |
| Metal Processing Plant | | 15 | 15 | 0 | 1 | 12m (40) | | | | 112 | 65 | 118m (390) | 50m (150) | 1 | 30m (100) | ANY | 3m (10) | 1, 2 or 3 | SMC 3 Minimum height = 5m (15 ft.).<br>May also be shown as a linear feature.<br>Minimum length of linear portrayal:<br>Level 1: 150m (500 ft.)<br>Level 2: 30m (100 ft.) |
| | | | 15 | 0 | 1 | 12m (40) | | | | 112 | 65 | 28m (90) | 12m (40) | 2 | 10m (30) | ANY | 3m (10) | | |
| | | 16 | 16 | 2 | 1 | 12m (40) | 2 | 0 | 30 | 112 | | | | 1 | 150m (500) | 150m (500) | 3m (10) | | |
| | | | 16 | 2 | 1 | 12m (40) | 2 | 0 | 30 | 112 | | | | 2 | 30m (100) | 30m (100) | 3m (10) | | |
| Sewage Treatment Plant | | 15 | 15 | 0 | 3 | 8m (25) | | | | 113 | 50 | 122m (400) | 88m (290) | 1 | 30m (100) | ANY | 5m (15) | 1, 2 or 3 | SMC 1, 2, Minimum height = 3m (10 ft.)<br>May also be shown as a linear feature.<br>Minimum length of linear portrayal.<br>Level 1: 150m (500 ft.)<br>Level 2: 30m (100 ft.) |
| | | | 15 | 0 | 3 | 8m (25) | | | | 113 | 50 | 28m (90) | 10m (30) | 2 | 10m (30) | ANY | 5m (15) | | |
| | | 16 | 16 | 2 | 3 | 8m (25) | 3 | 0 | 30 | 113 | | | | 1 | 150m (500) | 150m (500) | 5m (15) | | |
| | | | 16 | 2 | 3 | 8m (25) | 3 | 0 | 30 | 113 | | | | 2 | 30m (100) | 30m (100) | 5m (15) | | |





MEASUREMENTS ARE IN METERS (FEET)