Preservation Action Plan for Computer-Aided Design/Digital Design Records/Vector Graphics
National Archives and Records Administration (NARA)

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Electronic Record or Digital Surrogate Types and Associated Formats

Information that is accessed and updated through software (a designer and viewer) that enables users to design a product. The steps in the design process include creating, modifying, and representing the product in two and three dimensions.

Essential Characteristics of Computer-Aided Design/Digital Design Records/Vector Graphics

As a general rule, appearance characteristics for this record type are layout, fonts, images, line work, resolution, color and scale. All files need to be internally referenced only.

Appearance

Name	Definition	Function Description
Layout/Scale	Ratio of the distance on a plan, elevation or section to the corresponding distance on the surface the plan represents.	
Size	pixel dimensions	
Geometry	Includes angular unit, dimensions, array, axis tripod (XYZ coordinates used to visualize).	Required to create plans and visualizations based on the underlying data.
Text	Font; Orientation: text direction (left to right, angled, vertical, etc.); Color	These characteristics may be essential if the text displayed in CAD records, such as plan legends or display headings, bears meaning through its formatting. The text itself is always essential, but the formatting may also

		be essential when it is evidence of how the maps were used or displayed by the creator.
Color	Hue; Saturation; Brightness (Light Source and Light Intensity for shadowing/shading); Contrast	Even if exact colors cannot be made persistent, distinctions between colors may be essential to understand the attributes and overlays displayed as a result of a user query. All of these characteristics are ways of measuring and making distinctions between colors. The International Color Consortium and Microsoft Windows Image Color Management profiles define standard methods of generating and interpreting numeric values that describe color to ensure color consistency across platforms and devices.

Structure

Name	Definition	Function Description
CAD Structure	**HEADER** section – General information about the drawing. Each parameter has a variable name and an associated value. **CLASSES** section – Holds the information for application-defined classes whose instances appear in the BLOCKS, ENTITIES, and OBJECTS sections of the database. Generally does not provide sufficient information to allow interoperability with other programs.	Manner in which elements are organized, interrelated, and displayed.

	TABLES section – This section contains definitions of named items.	

Behavior

Name	Definition	Function Description
Manipulation Functionality	The ability to examine relationships within a table or between tables.	Once there is a defined schematic, the ability to manipulate exists.
Display	Graph	The only essential behavior for a digital photograph is the ability to visually render it. Other functionality, such as photo enhancement or manipulation, may be available in the user's native software environment but is not inherent to the record.
Display Graph or Plot	Features on one data layer are overlaid onto those of other data layers in order to show areas which have a certain combination of attributes: Single map; Multiple overlays; 3-dimensional display	The ability to graph and plot data is essential to the meaning of GIS map records. If there is no value to the map display, or no ability to plot, then the records could be handled much like databases.
Display Report	Report(s) from data tables	
Manipulation Functionality	Includes but not limited to: Draw; Zoom; Animate (continuous and/or step-by-step progression); Contour; Pan; Enhance (smooth, simplify, merge, dissolve, rotate, invert)	Depending on the software toolkit and data elements available to the user, a host of behaviors are possible that may be essential to the meaning or value of the records. Much CAD functionality concerns manipulation of the display, whether it be a plotted map or reported data from a query. The data elements that allow this functionality are a function of the data type and transfer

		format. If the records' value lies in how the creator manipulated plan attributes and the utilities they used to do so, these behaviors will have to be identified and articulated at appraisal or transfer.

Context

Name	Definition	Function Description
Series	A group of related records that are normally used and filed as a unit because they relate to a similar activity/function. The relationship between records and the series of which they are a part must be preserved.	
Descriptive Metadata	May include but is not limited to: Caption; Subject; Date; Event; Creator; Transaction.	Information contained within the record that refers to the intellectual content of material and aids discovery of such materials. Assumes that all descriptive metadata for a database is contained within the structure and content of the database itself.

Current NARA Transfer Guidance for Computer-Aided Design/Digital Design Records/Vector Graphics

Bulletin 2014-04

- Preferred:
  - Extensible 3D (X3D)
  - Standard for the Exchange of Product Model Data (STEP) ISO 10303-28:2007.

- Acceptable:
  - Portable Document Format/Engineering (PDF/E)
  - Universal 3D (U3D)
  - Product Representation Compact (PRC)

Current NARA Format(s) for Public Access and Reference for Computer-Aided Design/Digital Design Records/Vector Graphics

Formats for Public Access are those made available online through the National Archives Catalog. Formats for Reference are defined as those made available to researchers upon direct requests for digital copies.

Formats Available for Public Access: Content created or delivered for public access in the Catalog is delivered primarily in the following file formats: PDF (Textual and Image), JPEG (Textual and Image), MP3 (Audio), and MP4 (Audio/Video) and ASCII (Datasets). Other file formats may be present depending on when they were added to the Catalog.

Format(s) Available for Reference: When available, records may be delivered to researchers in the formats in which they are preserved.