



Standard Specification for 3D Imaging Data Exchange, Version 1.0¹

This standard is issued under the fixed designation E2807; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification describes a data file exchange format for three-dimensional (3D) imaging data, known as the ASTM E57 3D file format, Version 1.0. The term “E57 file” will be used as shorthand for “ASTM E57 3D file format” hereafter.

1.2 An E57 file is capable of storing 3D point data, such as that produced by a 3D imaging system, attributes associated with 3D point data, such as color or intensity, and 2D imagery, such as digital photographs obtained by a 3D imaging system. Furthermore, the standard defines an extension mechanism to address future aspects of 3D imaging.

1.3 This specification describes all data that will be stored in the file. The file is a combination of binary and eXtensible Markup Language (XML) formats and is fully documented in this specification.

1.4 All quantities standardized in this specification are expressed in terms of SI units. No other units of measurement are included in this standard.

1.4.1 *Discussion*—Planar angles are specified in radians, which are considered a supplementary SI unit.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This standard does not purport to address legal concerns, if any, associated with its use. It is the responsibility of the user of this standard to comply with appropriate regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

[E2544 Terminology for Three-Dimensional \(3D\) Imaging Systems](#)

2.2 IEEE Standard:³

[754-1985 IEEE Standard for Binary Floating-Point Arithmetic](#)

2.3 IETF Standard:⁴

[RFC 3720 Internet Small Computer Systems Interface \(iSCSI\)](#)

2.4 W3C Standard:⁵

[XML Schema Part 2: Datatypes Second Edition](#)

3. Terminology

3.1 *Definitions*—Terminology used in this specification conforms to the definitions included in Terminology [E2544](#).

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *backward compatibility, n*—ability of a file reader to understand a file created by a writer of an older version of a file format standard.

3.2.2 *byte, n*—grouping of 8 bits, also known as an octet.

3.2.3 *camel case, n*—naming convention in which compound words are joined without spaces with each word’s initial letter capitalized within the component and the first letter is either upper or lowercase.

3.2.4 *camera image, n*—regular, rectangular grid of values that stores data from a 2D imaging system, such as a camera.

3.2.5 *camera projection model, n*—mathematical formula used to convert between 3D coordinates and pixels in a camera image.

3.2.6 *file offset, n*—see *physical file offset*.

3.2.7 *file-level coordinate system, n*—coordinate system common to all 2D and 3D data sets in a given E57 file.

3.2.8 *forward compatibility, n*—ability of a file reader to read a file that conforms to a newer version of a format specification than it was designed to read, specifically having the capability to understand those aspects of the file that were defined in the version it was designed to read, while ignoring those portions that were defined in later versions of the format specification.

¹ This specification is under the jurisdiction of ASTM Committee E57 on 3D Imaging Systems and is the direct responsibility of Subcommittee E57.04 on Data Interoperability.

Current edition approved Feb. 1, 2011. Published March 2011.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard’s Document Summary page on the ASTM website.

³ For referenced IEEE standards, visit <http://grouper.ieee.org/groups/754>.

⁴ For referenced Internet Engineering Task Force (IETF) standards, visit the IETF website, www.ietf.org.

⁵ String representations (the lexical space) of the numeric datatypes are documented in the W3C standard: “XML Schema Part 2: Datatypes Second Edition”, available on the website <http://www.w3.org/TR/xmlschema-2/>.