# Archimedes Palimpsest Metadata Standard 1.0
## 7 June 2006
## Revision 5

**INTRODUCTION**

1. Objectives. This standard is intended to provide a common set of terminology and definitions for the archival documentation of digital multispectral imagery data used in the study of the manuscript titled: *The Archimedes Palimpsest*. This standard establishes the names and definitions of data elements, specifies the types and ranges of values these elements may contain, and defines requirements for the entry of metadata for these elements.

The primary uses of this metadata are to:
a)      maintain a standard for the research team's use of digital imagery or scanned data;
b)      provide information about an organization's data holdings to external data catalogs;
c)      provide information needed to process and interpret data to be transferred to an external source.

2. Scope. This standard is intended to support the collection and processing of multispectral imagery metadata. It is intended for use by the Archimedes Palimpsest imagery team and hosts of the archival imagery and scanned data. The standard is not intended to reflect an implementation design. Its development draws from existing standards that allow four criteria provided by metadata to be determined:
a)      availability: data needed to determine the sets of data that exist for a given location;
b)      fitness for use: data needed to determine if a set of data meets a specific need;
c)      access: data needed to acquire an identified image and its associated data set;
d)      transfer: data needed to process, share and use an image and its data set.

This standard establishes the names of data elements and compound elements to be used for these purposes, definitions of these data elements and compound elements, and information about the values that are to be provided for the data elements. This standard does not specify how this information is organized in a system, nor how it is stored, accessed, disseminated, or presented to the users.

4. Related Standards. These standards were developed to allow the transfer of digital multispectral imagery data sets between imagery databases. They draw from the standards used in related fields having features and goals in common with the Archimedes Palimpsest Project, in particular:

a) *Dublin Core Metadata Initiative Element Set* (ISO Standard 15836) [1];
b) *Content Standard for Digital Geospatial Data* (FGDC-STD-001-1998)[2];
c) *Art Museum Image Consortium* (AMICO)[3];

**DEFINITION OF METADATA**

Metadata are data elements about the content, quality, condition, and other characteristics of the data sets that make up the digital holdings. Metadata records are to be produced according to rules and definitions governing several subtypes:

    1. Identification Information
    2. Spatial Data Reference Information
    3. Imaging and Spectral Data Reference Information
    4. Data Type Information
    5. Data Content Information
    6. Metadata Reference Information

**METADATA PRODUCTION RULES**

Sections 1 through 6 define the production rules used for constructing metadata records from these subtypes. Conventions used in these rules are:
    CORE: required metadata
    TYPE: single or multiple (compound) entries may be present
    DOMAIN: permissible metadata formats and values

1. Identification Information: basic information about the data set; domain must accord with external standard standards (e.g. Dublin Core).

1.1 Resource Identifier: A unique data identification number used to reference the data set.
CORE: YES    TYPE: SINGLE
DOMAIN:    TEXT

    1.1.1 File Name:  Unique identifier for the data file or files assigned to the original image or scanned data.
    CORE: YES    TYPE: SINGLE
    DOMAIN:    TEXT

1.2. Date: Date of creation of resource.
CORE: YES    TYPE: SINGLE
DOMAIN:    TEXT

1.3. Author or Creator:  The individual or individuals responsible for acquiring content for the data set.
CORE: YES    TYPE: SINGLE
DOMAIN:    TEXT

1.4 Subject and Keywords:  Description of object type
CORE: YES    TYPE: COMPOUND
DOMAIN:    TEXT

1.5. Publisher:  Organization sponsoring the data set

CORE:NO     TYPE: SINGLE
DOMAIN:     TEXT


1.6.Other Contributor(s):  Other contributors to the content of the resource, data set or study
CORE:NO     TYPE: SINGLE
DOMAIN:     TEXT


1.7. Resource Type:  Type of data set based on the content of the data
CORE:YES    TYPE: SINGLE
DOMAIN:     "Image"
            "Annotation"
            "Stitched Image"


1.8 Source Lineage: information about the events, parameters, and source data that constructed the
data set, and information about the responsible parties.
CORE: YES   TYPE: COMPOUND
DOMAIN:     TEXT


1.9. Rights Management:  Information about rights held in or over the resource
CORE:YES    TYPE: COMPOUND
DOMAIN:     TEXT


2. Spatial Data Reference Information or Coverage: the spatial extent or scope of the data set


2.1 Coordinate Units: unit type used in quantitative spatial metadata
CORE:YES    TYPE: SINGLE
DOMAIN:     "pixel"
            "centimeters"
            "millimeters"
            "micrometer"


2.2 X Resolution: number of resolution elements per coordinate unit in the x-direction
CORE:YES    TYPE: SINGLE
DOMAIN:     REAL NUMBER


2.3 Y Resolution: number of resolution elements per coordinate unit in the y-direction
CORE:YES    TYPE: SINGLE
DOMAIN:     REAL NUMBER


2.4 Upper Left XY Coordinates: upper left coordinate of the limit of imaging expressed in
resolution units.
CORE:YES    TYPE: COMPOUND
DOMAIN:     x=  n and y=  n


2.5 Lower Right XY Coordinates: lower right coordinate of the limit of imaging expressed in
resolution units.

CORE:YES   TYPE: SINGLE
DOMAIN:     x= n and y= n

2.6 Bounding Coordinates: the limits of coverage of the complete data set for the entire sample expressed by Cartesian coordinate values assigned by the x:y table software in the order upper left, lower right.
CORE:YES   TYPE: COMPOUND
DOMAIN:     REAL NUMBER

2.7 Grid Coordinate System: Orientation of and definition of Cartesian coordinate so that spatial positions can be readily transformed to and from plane coordinates.
CORE:YES   TYPE: COMPOUND
DOMAIN:     TEXT

2.8 Vertical Coordinate System Definition: the reference frame or system from which vertical distances (altitudes or depths) are measured.
CORE:NO   TYPE: COMPOUND
DOMAIN:     TEXT

2.9 X-Positional Accuracy: an estimate of accuracy of the horizontal positions of the spatial objects.
CORE:YES   TYPE: SINGLE
DOMAIN:     REAL NUMBER

2.10 Y-Positional Accuracy: an estimate of accuracy of the horizontal positions of the spatial objects.
CORE:YES   TYPE: SINGLE
DOMAIN:     REAL NUMBER

2.11 Vertical Positional Accuracy: an estimate of accuracy of the vertical positions in the data set.
CORE:NO   TYPE: SINGLE
DOMAIN:     REAL NUMBER

3. Imaging and Spectral Data Reference Information: information describing the conditions used to acquire image or scanned data objects

3.1 Spectral Range: Spectral range of imaging expressed, giving lowest and highest captured wavelengths
CORE:YES   TYPE: COMPOUND
DOMAIN:     TEXT

3.2 Illumination: Type of lighting or energy used to produce image or scanned data.
CORE:YES   TYPE: SINGLE
DOMAIN:     "Tungsten"
               "Quartz"
               "LWUV"

"X-Ray"

3.3 Illumination filters: filters placed between light or energy source and object during image or scanned data acquisition.
CORE:NO    TYPE: COMPOUND
DOMAIN:    TEXT

3.4 Acquisition filters: filters placed between object and camera or detectors during image or scanned data acquisition.
CORE:NO    TYPE: COMPOUND
DOMAIN:    TEXT

3.5 Imaging System: pertinent imaging variables and parameters
CORE:NO    TYPE: COMPOUND
DOMAIN:    TEXT

4. Data Type Information

4.1 Data File TYPE:   File type of the data file.
CORE:YES   TYPE: SINGLE
DOMAIN:    "PSD" Photoshop format
           "TIFF" Tagged Image File Format
           "JPEG" Joint Photographic Experts Group format
           "GIF" Graphic Interchange Format
           "ASCII" American Standard Code for Information Interchange

4.2 Format Version Number: Version number of the data file format.
CORE:NO    TYPE: SINGLE
DOMAIN:    TEXT

4.3 Format Version Date: date of the version of the data file format.
CORE:NO    TYPE: SINGLE
DOMAIN:    TEXT

4.4 File Compression Technique: description of encoding or compression of algorithms or processes used to compress the data sets, including means of obtaining these algorithms or processes.
CORE:NO    TYPE: SINGLE
DOMAIN:    TEXT

4.5 File Decompression Technique: Recommendations of algorithms or processes (including means of obtaining these algorithms or processes) that can be applied to read or expand data sets to which data compression techniques have been applied.
CORE:NO    TYPE: COMPOUND
DOMAIN:    TEXT

4.6 File Size:  The size of the data set in Kilobytes.
CORE:YES    TYPE: SINGLE
DOMAIN:    REAL


4.7 File Processing Techniques: Description of image or scanned data processing tools and techniques that contributed to the creation of the data file.
CORE:NO    TYPE: COMPOUND
DOMAIN:    TEXT


      4.7.1 Stitching Techniques: Description of stitching tools and techniques that contributed to the creation of the stitched data file.
      CORE:NO    TYPE: COMPOUND
      DOMAIN:    TEXT


5 Content Description Information: a general assessment of the content of the data set.


5.1 Content Keyword: word or phrase used to describe the name of the undertext in the data set.
CORE:YES    TYPE: SINGLE
DOMAIN:    "Archimedes"
           "Hyperides"
           "Aristotle Commentary"
           "Unknown"


5.2 Source Information: Source object that served as the basis for the data element.
CORE:YES    TYPE: COMPOUND
DOMAIN:    "Palimpsest leaf"
           "Heiberg photograph"
           "Original Images"


5.3 Foliation Scheme: Reference for the type of foliation used.
CORE:YES    TYPE: COMPOUND
DOMAIN:    "Palimpest foliation"
           "Netz name"


      5.3.1 Secondary Foliation Scheme: Reference for the type of foliation used.
      CORE:NO    TYPE: COMPOUND
      DOMAIN:    "Palimpest foliation"
             "Netz name"


5.4 Foliation Number: Reference number for the location of the original source for the image or scanned data in the source object according to the foliation scheme used
CORE:YES    TYPE: SINGLE
DOMAIN:    TEXT

5.4.1 Secondary Foliation Number: Secondary reference number for the location of the original source for the image or scanned data in the source object according to the foliation scheme used

CORE: NO       TYPE: SINGLE
DOMAIN:      TEXT

5.5 Source Citation: Numeric or descriptive reference for a source document.
CORE: NO       TYPE: COMPOUND
DOMAIN:      TEXT

5.6 Cross Reference: Information about other, related or derived data sets; includes stitched or partially assembled image or scanned data.
CORE: NO       TYPE: COMPOUND
DOMAIN:      TEXT

6 Metadata Reference Information: Information on the validity and state of the metadata information, and the responsible party.
TYPE: compound

6.1 Metadata Status: flag for presence and validity of all core metadata.
CORE: YES     TYPE: SINGLE
DOMAIN:      "Valid"
                    "Incomplete"

6.2 Metadata Date: The date that the metadata were created or last updated.
CORE: YES     TYPE: SINGLE
DOMAIN:      TEXT

6.3 Metadata Review Date: The date of the latest review of the metadata entry.
CORE: NO       TYPE: SINGLE
DOMAIN:      TEXT

6.4 Metadata Future Review Date: The date by which the metadata entry should be reviewed.
CORE: NO       TYPE: SINGLE
DOMAIN:      TEXT

6.5 Metadata Contact: The party responsible for the metadata information.
CORE: YES     TYPE: SINGLE
DOMAIN:      TEXT

6.6 Metadata Standard Name: The name of the metadata standard used to document the data set.
CORE: YES     TYPE: SINGLE
DOMAIN:      "Archimedes Palimpsest Metadata"

6.7 Metadata Standard Version: Identification of the version of the metadata standard used to document the data set.
CORE: YES    TYPE: SINGLE
DOMAIN:    TEXT

6.8 Metadata Extensions: a reference to extended elements to the standard which may be defined by a metadata producer or the academic community. Extended elements are subjective elements outside the Standard, but needed by the metadata producer or user, sometimes referred to as dynamic metadata.  If extended elements are created to the Archimedes Digital Multispectral imagery metadata, they must follow the geospatial and/or Dublin Core guidelines for Creating Extended Elements and this document format.
CORE: NO    TYPE: COMPOUND
DOMAIN:    TEXT

## Appendix A. References

1.  Dublin Core Metadata Initiative
http://dublincore.org/documents/2001/04/12/usageguide

 2.  Federal Geographic Data Committee. FGDC-STD-001-1998. Content standard for digital geospatial metadata (revised June 1998),
http://www.fgdc.gov/standards/status/csdgm_rs_ex.html

3.  Art Museum Image Consortium
http://www.amico.org/AMICOlibrary/dataspec.text.html

4.  Department of Commerce, 1992, Multispectral imagery data Transfer Standard (SDTS) (Federal Information Processing Standard 173): Washington, Department of Commerce, National Institute of Standards and Technology.  http://www.fgdc.gov/metadata/csdgm/

5.  The Government Information Locator Service (GILS): Report to the Information Infrastructure Task Force (May 2, 1994).

6. Getty Research Institute Standards Program, 2000. Institute, Defining Metadata.
http://www.getty.edu/research/institute/standards/intrometadata/2_articles/index.html

## Appendix B.  Further Guidelines (TBD)