NASA TECHNICAL STANDARD

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STILL AND MOTION IMAGERY METADATA STANDARD

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FOREWORD

This Standard is published by the National Aeronautics and Space Administration (NASA) to provide uniform engineering and technical requirements for processes, procedures, practices, and methods that have been endorsed as standard for NASA programs and projects, including requirements for selection, application, and design criteria of an item.

This Standard is approved for use by NASA Headquarters and NASA Centers, including Component Facilities and Technical and Service Support Centers.

This Standard establishes a comprehensive guide for all image records produced by or for NASA and also defines applicable requirements for metadata as required by Federal law.

NASA has been managing and retaining image records from the late 1950s to the present. NASA and its affiliates, like all Federal agencies, has a requirement to provide for the safekeeping of records that document the Agency's mission and to transfer those records to the National Archive and Records Administration (NARA) based on record retention schedules developed between NASA and NARA.

The management and retention of NASA still and motion imagery collections have evolved over the years and are documented in paper log books, spreadsheets, and, most recently, in stand-alone computerized databases. The metadata or information about the imagery varies from catalog to catalog, depending on the needs of the personnel who are responsible for the custodial care of the image records.

This Standard has been developed by the NASA Metadata Working Group under direction of the NASA Imagery Experts Program (NIEP).

Requests for information, corrections, or additions to this Standard should be submitted via "Feedback" in the NASA Standards and Technical Assistance Resource Tool at https://standards.nasa.gov/.

Larry N. Sweet
NASA Chief Information Officer

Dec. 16, 2013
Date

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STILL AND MOTION IMAGERY METADATA STANDARD

1. SCOPE

This Standard establishes requirements and responsibilities related to metadata for the National Aeronautics and Space Administration (NASA) still and motion image records. It contains the required core metadata set and a recommended extended metadata set, along with guidelines to assist NASA organizations in complying with the Standard. The Standard does not address Section 508 compliance for image records.

1.1 Purpose

The purpose of this Standard is to establish a comprehensive guide for all image records produced by or for NASA

1.2 Applicability

Compliance with this Standard is mandatory for all NASA Centers and affiliates that support imagery tasks and for NASA projects and/or programs that manage and retain image records. The individual NASA Centers and affiliates are responsible for implementation and enforcement.

This Standard is applicable to all still and motion image records created by and/or acquired for NASA and its affiliates.

This Standard is approved for use by NASA Headquarters and NASA Centers, including Component Facilities and Technical and Service Support Centers, and may be cited in contract, program, and other Agency documents as a technical requirement. This Standard may also apply to the Jet Propulsion Laboratory or to other contractors, grant recipients, or parties to agreements only to the extent specified or referenced in their contracts, grants, or agreements.

Any decision to waive or vary from this Standard requires the concurrence of the NASA Imagery Experts Group, Configuration Control Board.

Requirements are numbered and indicated by the word "shall." Explanatory or guidance text is indicated in italics beginning in section 4.

1.3 Tailoring

Any decision to waive or vary from this Standard requires the concurrence of the NASA Imagery Experts Group, Configuration Control Board. Tailoring of this Standard for application to a specific program or project shall be formally documented as part of program or project requirements and approved by the Technical Authority.

1.4 General Guidance

This document establishes at minimum, the necessary metadata for image records and is intended to be the foundation for the management and retention of all NASA image records. The metadata Standard is compliant with Dublin Core® Metadata Initiative (DCMI) specifications. This Standard is subject to change upon revision of the laws governing Federal records retention.

These requirements apply to all NASA image records. All NASA Centers and facilities are responsible for keeping up to date with applicable Federal requirements.

For this Standard, an image record refers to all still and motion imagery, regardless of physical form or characteristics, made or received by NASA in connection with the transaction of business and retained or appropriate for retention by NASA as evidence of the organization, functions, policies, decisions, procedures, operations, or other activities of NASA or because of the informational value of data in them. (44 U.S.C Chapter 33, Disposal of Records). Refer to NPR 1441.1, NASA Records Retention Schedules, for clarification of the image record type and retention.

2. APPLICABLE DOCUMENTS

2.1 General

The documents listed in this section contain provisions that constitute requirements of this Standard as cited in the text.

2.1.1 The latest issuances of cited documents shall apply unless specific versions are designated.

2.1.2 Non-use of specific versions as designated shall be approved by the responsible Technical Authority.

The applicable documents are accessible via the NASA Standards and Technical Assistance Resource Tool at **https://standards.nasa.gov/** or may be obtained directly from the Standards Developing Organizations or other document distributors

2.2 Government Documents

Adopters of this Standard shall be familiar with information in these applicable documents. All internet sources were retrieved on November 21, 2013.

National Archives

44 U.S. C. Chapter 33, Disposal of Records
http://www.archives.gov/about/laws/disposal-of-records.html#def

NASA

NPR 1441.1	NASA Records Retention Schedules http://nodis3.gsfc.nasa.gov./displayDir.cfm?t=NPR&c=1441&s=1D

Office of the Federal Register

	Electronic Code of Federal Regulations, Title 36, Part 1237-Audiovisual, Cartographic, and Related Records Management http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=9bba95f14e09c5fd79419f74efd282d6&rgn=div5&view=text&node=36:3.0.10.2.26&idno=36

2.3 Non-Government Documents

None.

2.4 Order of Precedence

This Standard establishes the requirements and responsibilities related to metadata for NASA still and motion image records but does not supersede or waive established Agency requirements found in other documentation.

2.4.1 Conflicts between this Standard and other requirements documents shall be resolved by the responsible Technical Authority.

3. ACRONYMS AND DEFINITIONS

3.1 Acronyms and Abbreviations

®	registered trademark
ARC	Ames Research Center
AVI	audio video Interleave
CCSDS	Consultative Committee for Space Data Systems
CMS	Content Management System
CMYK	cyan, magenta, yellow, black
DCMI	Dublin Core® Metadata Initiative
DFRC	Dryden Flight Research Center
DPX	digital picture exchange
EXIF	Exchangeable Image File Format
FL	Florida
GRC	Glenn Research Center

GISS	Goddard Institute of Space Studies
GFSC	Goddard Space Flight Center
ICC	International Code Council
ISO	International Organization for Standardization
ISS	International Space Station
IV&V	independent verification and validation
JPG	joint photographic expert group
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
KSC	Kennedy Space Center
LRC	Langley Research Center
MAF	Michoud Assembly Facility
MIME	Multipurpose Internet Mail Extensions
MLP	Mobile Launch Platform
mm	millimeter
MOV	QuickTime movie
MSFC	Marshall Space Flight Center
MXF	material exchange format
NAI	NASA Astrobiology Institute
NARA	National Archive and Records Administration
NASA	National Aeronautics and Space Administration
NHQ	NASA Headquarters
NIEP	NASA Imagery Experts Program
NLSI	NASA Lunar Science Institute
NPD	NASA Policy Directive
NPR	NASA Procedural Requirements
NRRS	NASA Records Retention Schedules
OAIS	Open Archival Information System
OV	Orbiter Vehicle
SI	Système International
SMPTE	Society of Motion Picture & Television Engineers
SSC	Stennis Space Center
sRGB	standard red, green, blue
STS	Space Transportation System
STSCI	Space Telescope Science Institute
TIF	tagged image file (format)
TR	technical report
U.S.C.	United States Code
VAB	Vehicle Assembly Building
VIRIN	Visual Information Record Identification Number
WFF	Wallops Flight Facility
WSTF	White Sands Test Facility

3.2 Definitions

Camera RAW: Image file format of the uncompressed data acquired by a camera sensor.

Dublin Core® Metadata Initiative: A metadata element standard of generic resource descriptions that provides a set of rules for describing content.

Exchangeable Image File Format (EXIF): Metadata elements of descriptive information embedded in an image record by the device that acquired the content.

Internet Media Type: (also referred to as Multipurpose Internet Mail Extensions (MIME) type) An identifier for file formats that identifies the type and encoding of the data file.

Metadata: Structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use, or manage an image record.

Metadata Element: A term used as part of a standard that describes content and provides structured information about an image record.

Material Exchange Format (MXF): Object-based file format that wraps video, audio, and other bitstreams optimized for content workflow and management.

Section 508: An Amendment to the Rehabilitation Act of 1973 that requires Federal agencies to make their electronic and information technology accessible to people with disabilities.

4. REQUIREMENTS

a. All organizations defined in section 1.2 in this Standard shall establish an implementation schedule for the metadata Standard for the management and retention of NASA image records.

b. This implementation schedule shall be completed and operational by January 2016.

c. All image records acquired before the January 2016 date shall have this Standard applied to them when the image record is converted, digitized, or transformed into a new image record.

(1) The original image record's metadata, descriptors, or naming identifications shall be retained in the new image record's metadata.

(2) All available information from the original image record shall be retained as part of the file's metadata.

For example, when a still negative from the Shuttle Program is scanned, the new image shall have this Standard applied. These requirements apply to a motion picture film that is scanned or a video tape that is digitized.

4.1 Core Metadata Set and Elements

All NASA image records shall include the core metadata set elements listed (and described) in Table 1, Core Metadata Elements.

The core metadata set is the minimum complement of required metadata elements for NASA image records necessary to meet National Archive and Records Administration (NARA) standards for Federal records retention (Electronic Code of Federal Regulations, Title 36, Part 1237- Audiovisual, Cartographic, and Related Records Management). The set is not intended to limit the amount of metadata for image records. Organizations responsible for the management and retention of NASA image records can use as many metadata elements as they elect, as long as the minimum core set is provided. For a list of the elements and examples see Appendix A in this Standard.

Table 1—Core Metadata Elements

Element	Description
Copyright	Information about rights held in and over the image record. The rights information includes a statement about the property rights associated with the image record, including intellectual property rights.
Creator	The entity primarily responsible for making the image record. A creator can be a person, an organization, or a service.
Date Taken	Point in time associated with the acquisition or origin of the image record.
Description	The explanation of the image record. It can include, but is not limited to, an abstract, a table of contents, a graphical representation, a free-text account, or a generic narrative of the image record.
Disposition	Instructions for the disposition of the image record in accordance with the NASA Records Retention Schedule.
File Format	The Internet Media Type or MIME file format, physical medium, or dimensions of the image record.
Image Record Identifier	The unique identifier associated with each image record. Section 5 in this Standard describes the naming convention for the image record identifier.
Location	Named place specified by its geographic position of the subject matter in the image. Where appropriate, named places or time periods can be used in preference to numeric identifiers such as sets of coordinates or date ranges. Latitude and longitude coordinates are not required.
Media Type	Describes the visual representation of the file. Identifies the image record as a moving or still image with a description such as 35-mm motion picture color film.
Title	Name given to the image record.
Use Restrictions	Information about who can access the image record or an indication of its security status. Can include information regarding access or restrictions based on privacy, security, or other policies.

4.2 Extended Metadata Set and Elements

The extended metadata set consists of recommended metadata elements that are not required for Federal records retention. The set does not encompass all of the possible elements that can be associated with image records but consists of additional elements that can help with the imagery workflow and provide assistance with the management and retention of image records.

EXIF metadata elements are considered optional. The EXIF elements are not listed here because they are defined by other standards and because the use of EXIF elements can vary by

manufacturer. Elements in both the core and extended sets, however, may be embedded into the image record through the use of customizable EXIF features by the device that acquires the image record.

Table 2, Extended Metadata Elements, contains the element name and a brief description. All NASA image records may have these elements. For a list of the elements and examples, see Appendix B in this Standard.

Table 2—Extended Metadata Elements

Additional Identifiers	Supplementary identifiers for the image record.
Color Space.	The description of the range of colors, or gamut, that a camera can see, a printer can print, or a monitor can display
Creator Contact Information	All necessary information to contact the creator of the image record.
Creator Tool	The name of the first known tool used to create the image record.
Instructions	Any of a number of instructions from the provider or creator to the receiver of the item.
Keywords	An index of terms or subject classifications.
Language	Language of the image record.
Publisher	The entity responsible for making the image record available. A publisher can be a person, an organization, or a service.
Rights Statement	A web uniform resource locator for a statement of the ownership and usage rights for the image record.
Scene List	An inventory of the scenes that comprise the image record.
Script	Dialogue and instructions for a film or television program.
Source	Defines the specific content, i.e., still image or motion image footage, that makes up the image record. The image record can be derived from the source in whole or in part.
Total Runtime	The interval of time of a motion image or video from start to finish.

5. NAMING CONVENTION

One of the primary issues with managing imagery is being able to provide a unique identifier for each image record.

a. NASA imaging providers shall label all image records with a unique identifier.

The naming convention provides the means for each organization that creates and manages image records for NASA to assign a unique identifier for each image record.

b. When an image record is transferred between organizations, the image record identifier shall not be changed.

c. The NASA Center name shall be the first field.

Use the official acronym of the NASA Center or location. Examples are in section 5.1.1 in this Standard.

d. The second field shall be the date of the image record, written as either year or year/month/day.

See section 5.1.2 in this Standard for examples.

e. Organizations shall assign a unique identifiable sequential number using the options of a third or fourth field.

A media identifier and/or item number may be used in the creation of the image record identifier.

5.1 Naming Convention Fields

5.1.1 NASA Center

The Center location or affiliate site shall be where the image record was initially acquired, as listed below:

Ames Research Center	ARC
Dryden Flight Research Center	DFRC
Glenn Research Center	GRC
Goddard Institute of Space Studies	GISS
Goddard Space Flight Center	GSFC
Independent Verification and Validation (IV&V) Facility	IVV
Jet Propulsion Laboratory	JPL
Johnson Space Center	JSC
Kennedy Space Center	KSC
Langley Research Center	LRC
Marshall Space Flight Center	MSFC
Michoud Assembly Facility	MAF
NASA Astrobiology Institute	NAI
NASA Headquarters	NHQ
NASA Lunar Science Institute	NLSI
Space Telescope Science Institute	STSCI
Stennis Space Center	SSC
Wallops Flight Facility	WFF
White Sands Test Facility	WSTF

5.1.2 Date

a. The date the image record was acquired shall be written as year, e.g., 2013, or as year/month/day, e.g., 20130529.

b. When the image record file format is changed or is migrated to a new storage medium, the date shall not be changed.

5.1.3 Media Identifier

The media identifier, when used, should be a unique identifier assigned by the organization that created the image record. It may be a program, project, mission identifier, vehicle zone coordinate, creator's name, or a combination of these.

5.1.4 Item Number

The item number is a sequential number. The number should be a unique identifiable number for each image record.

5.2 Naming Convention Use

The naming convention provides options to the variety of organizations that acquire and manage NASA image records. The following examples are provided to assist with the naming of the image record. The examples in this section have been created with the data from current still and motion imagery content.

Glenn Research Center

A GRC example with data taken from a still image from GRC ImageNet is the use of NASA Center, date as year, and item number. The current naming of C-2012-192 would become GRC-2012-192 after the Standard is implemented.

GRC-2012-192

GRC-	*2012-*	*192*
Center Name	*Date*	*Item Number*

The image was taken at Glenn Research Center in the year 2012 with the 192 item number assigned.

Johnson Space Center

A JSC example with data taken from a still image on Imagery Online is the use of NASA Center, date as year, and item number. The current naming for JSC2012e226645 would become JSC-2012-e226645 after the Standard is implemented.

JSC-2012-e226645

JSC	*2012*	*e226645*
Center Name	*Date*	*Item Number*

The image was taken at Johnson Space Center in the year 2012 and is an electronic still image with the 226645 item number assigned.

An example for a motion image or video with data taken from Imagery Online is the use of NASA Center, date as year, media identifier, and item number. The current naming of iss035m020862317 would become JSC-2013-iss035-m020862317 after the Standard is implemented.

JSC-2013-iss035-m020862317

JSC-	*2013-*	*iss035-*	*m020862317*
Center Name	*Date*	*Media ID*	*Item Number*

The image was transmitted to JSC in the year 2013 from the International Space Station's (ISS') Expedition 35 crew. It is motion image with the 020862317 item number assigned.

Kennedy Space Center

The KSC example of a still image is the use of the NASA Center, date as year/month/day, along with the media identifier and item number for engineering imagery. The current naming for 133-OV103-810-01-20100909 would become KSC-20100909-133_OV103_810-01 after the Standard is implemented.

KSC-20100909-133_OV103_810-01

KSC-	*20100909-*	*133_OV103_810-*	*01*
Center Name	*Date*	*Media ID*	*Item Number*

The image was acquired at KSC on September 9, 2010. It was taken of STS-133 Shuttle Discovery's (OV-103's) nose panel (Orbiter zone 810), and it is image number 1 of the area.

On the same day, a Public Affairs photographer took images of the Orbiter mate. The naming convention used was the NASA Center, date as year, and the item number.

KSC-2010-5246

KSC-	*2010-*	*5246*
Center Name	*Date*	*Item Number*

The image was taken at KSC in the year 2010 and was the 5,246 image released by KSC Public Affairs that year.

APPENDIX A

CORE SET TABLE

A.1 Purpose and/or Scope

The purpose of this appendix is to provide guidance in the form of Table 3, Core Set Table.

A.2 Core Set Table

Table 3—Core Set Table

Element Name	Example	DCMI
Copyright	No copyright protection is asserted for this photograph.	dcterms:rightsHolder
Creator	NASA/KSC/Adam Baum, Ames Video Production Group	dc:creator
Date Taken	07/01/2008	dc:date
Description	Space Shuttle Atlantis, atop the mobile launcher platform, rolls back into high bay 1 of the Vehicle Assembly Building from Launch Pad 39A.	dc:description
Disposition	Permanent. Cut-off records at close of program/project or in 3-year blocks for long-term programs/projects. Transfer to records center storage.	dcterms:provenance
File Format	RAW, JPG, TIF, MOV, AVI, DPX, Other	dc:format
Image Record Identifier	GRC-2012-192, JSC-2012-e226645, JSC-2013-iss035-m020862317, KSC-20100909-133_OV103_810-01, KSC-2010-5246	dc:identifier
Location	Vehicle Assembly Building, KSC, FL	dc:coverage
Media Type	Digital still image, Digital motion image, 35-mm motion picture film	dc:type
Title	STS-117 Space Shuttle Atlantis roll back.	dc:title
Use Restrictions	Restricted NASA internal use only; Restricted pending review; Released to public	dc:rights

APPENDIX B

EXTENDED SET TABLE

B.1 Purpose and/or Scope

The purpose of this appendix is to provide guidance in the form of Table 4, Extended Set Table.

B.2 Extended Set Table

Table 4—Extended Set Table

Element Name	Examples	DCMI
Additional ID	KSC-07PD-2045, iss031e065030	dcterms:isVersionOf
Color Space	Adobe 1998, sRGB, CMYK	dcterms:isFormatOf
Creator Contact Information	NASA Headquarters, 300 E Street SW, Washington, DC 20024-3210	dc:contributor
Creator Tool	Adobe Photoshop, Apple FinalCut Pro	dcterms:accrualMethod
Instructions	Use embedded ICC Profile when printing.	dcterms:instructionalMethod
Keywords	STS-117, Shuttle, Atlantis, VAB, MLP	dc:subject
Language	English, Spanish, French, Chinese	dc:language
Publisher	Published by NASA	dc:publisher
Rights Statement	Using NASA Imagery and Linking to NASA Web Site	dcterms:accessRights
Scene List	STS-133 launch from pad surface, STS-134 launch from VAB roof	dcterms:isReferencedBy
Script	Link to content	(Link to content)
Source	Betacam tape number 1990-008, digital still image file number KSC-2011-1756	dc:source
Total Runtime	01:20:41, 1 hour: 20 minutes: 41 seconds	dcterm:PeriodOfTime

APPENDIX C

BEST PRACTICE GUIDELINES

C.1 Purpose and/or Scope

The purpose of this appendix is to provide guidance in the form of best practice guidelines.

C.2 Best Practice Guidelines

The best practice guidelines presented demonstrate how metadata should be integrated into the image workflow or lifecycle. The guidelines are not included here as procedures but are intended as examples to help organizations managing NASA image records to comply with the metadata Standard and Federal Record Retention Schedule.

To make the process effective, it is best to look at how the metadata should be associated with or embedded in the image record during the lifecycle of the content. Having the metadata process built into the imagery lifecycle provides an efficient means to manage and retain image records.

The process of acquiring metadata starts when the customer requests a service at the beginning of the image lifecycle (figure 1, Image Lifecycle). The who, what, why, when, and where of the task from the customer requirements, along with the metadata created when the imagery is acquired, has to be ingested with the image record. During the processing, the metadata is verified before the imagery is distributed and entered into a Content Management System (CMS). With the imagery and metadata entered into a CMS, it can be made available for use by the entire NASA community. Image records are managed for future projects and retained in accordance with NPR 1441.1, NASA Records Retention Schedules.

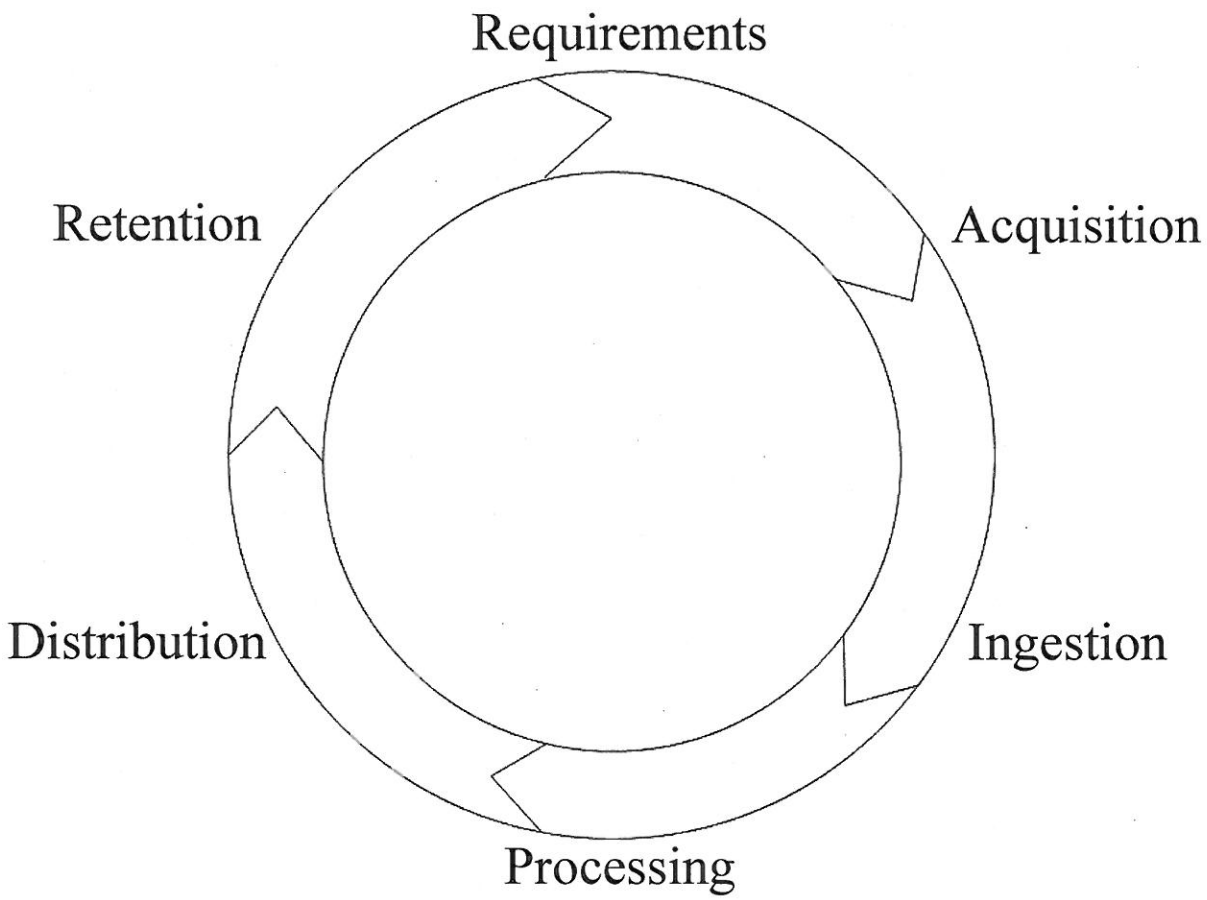

Figure 1—Image Lifecycle

When the lifecycle breaks down, imagery is distributed and stored in a way that increases the cost while reducing the value of the image record. The guidelines are intended to help organizations develop and maintain an image lifecycle to properly acquire, ingest, process, distribute, and retain image records.

C.2.1 Motion Imagery Guideline

Digital motion imagery is used to acquire a variety of content from live television and web streams to Hollywood productions that can take a year or more to finish. A large variety of cameras and file formats is also being used to acquire video to meet every demand. For the motion image guideline, the workflow is described using the MXF file format. Refer to figure 2, Metadata Workflow, for more details on this example of a metadata workflow.

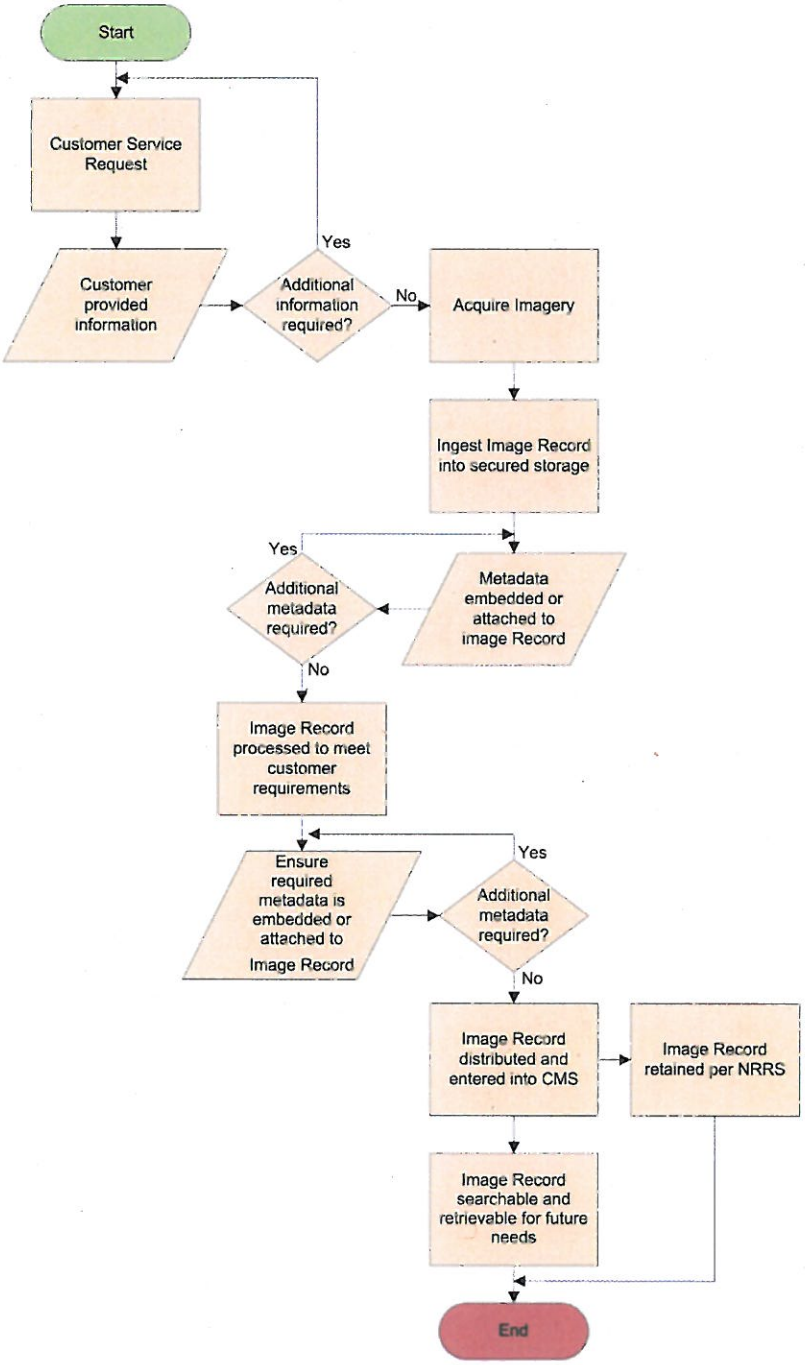

Figure 2—Metadata Workflow

Many cameras on the market use MXF files for recording video. It is a generic container that allows for a variety of data to be wrapped with the motion image record. Part of that data is the metadata used throughout the image lifecycle.

The videographer has the option with MXF-supported video cameras to add or import the name of the task, creator, location, along with other metadata directly into the device with the image record when it is being acquired.

After the imagery is ingested into a secured storage area, additional metadata should be added during post production. As the motion imagery clips are being edited, metadata tags should be added to describe what is taking place in the video and make future search and retrieval easier. The technician/editor enters the remaining required core metadata elements. (See section 4 of this Standard.)

The imagery can then be transcoded into the appropriate format for distribution and entered into a CMS. The workflow can vary for live events, with the image record being tagged during playout and the remaining required metadata entered when the imagery is loaded into the CMS for management and retention.

The CMS makes the imagery available to the customer as well as retrievable for future productions. The image record can also be transferred to NARA in accordance with the record retention schedule.

C.2.2 Still Imagery Guideline

Digital still cameras have a variety of features that can facilitate the capturing of metadata along with the image file. For the still image guideline, the workflow is described using the Nikon D3x camera and the features it provides. (Refer to figure 2 for more details on this example of a metadata workflow.)

The process of gathering metadata begins with the first discussion with the customer. Whether it is through an email request or a phone call, the customer service person receiving the requirements transfers all pertinent information to the photographer to assist with the acquisition of the imagery.

Before the photographer leaves for the job, the customizable metadata elements in the camera, such as the file name, copyright, and image comment, along with time and date, are set to ensure the data are acquired along with the image file. The image file format is set to camera RAW to allow for the TIF file to be created and transferred to NARA as part of the retention process.

While the images are being acquired, the photographer has the option of audio tagging images with additional information as needed. The photographer can add the names of any people in the field of view or, if taking images for engineering purposes, could name and describe the item or part that is being photographed.

Once the photographer has acquired the images, these are downloaded to a secured work area on a server. The photographer can batch rename the images if required to provide for a consistent image naming or Image Record Identifier, as well as to ensure the creator, description, and location metadata are entered with the image files along with any pertinent data that were acquired with the imagery.

A photography laboratory technician should check to make sure the appropriate metadata from the job have been entered by the photographer. If the data are not present, the technician contacts the photographer to update the image files.

The technician then retrieves the images from the photographer's folder and transfers them to the photography laboratory folder on the server. The technician prepares the imagery to meet the customer request and, as part of the process, enters the remaining required core metadata elements. (See section 4 in this Standard.) The imagery should then be entered into a CMS for distribution so the customer can review or download the imagery. Customers can also make selections for other products as desired.

Once the imagery is in the CMS, it can be searched for and retrieved. The proper retention schedule can be applied to the image record for transfer to NARA.

APPENDIX D

REFERENCE DOCUMENTS

D.1 Purpose and/or Scope

The purpose of this appendix is to provide guidance in the form of a list of reference documents with which the adopters of this Standard should be familiar in the course of managing imagery.

Access to the International Organization for Standardization (ISO) and Society of Motion Picture & Television Engineers (SMPTE) documents is available to NASA civil servants and contractors through the NASA Standards and Technical Assistance Resource Tool (https://standards.nasa.gov/) The documents are also available through the ISO (http://www.iso.org/) and SMPTE (http://standards.smpte.org/) web sites.

D.2 Reference Documents

All internet sources were retrieved on November 21, 2013.

D.2.1 Government Documents

Department of Defense

How to Create a VIRIN
http://www.defenseimagery.mil/learning/howto/virin.html

NASA

NPD 1383.1 — Release and Management of Audiovisual Products
http://nodis3.gsfc.nasa.gov./displayDir.cfm?t=NPD&c=1383&s=1C

NPD 1440.6 — NASA Records Management
http://nodis3.gsfc.nasa.gov./displayDir.cfm?t=NPD&c=1440&s=6H

National Archives

44 U.S.C. Chapter 31, Records Management by Federal Agencies
http://www.archives.gov/about/laws/fed-agencies.html

D.2.2 Non-Government Documents

Consultative Committee for Space Data Systems (CCSDS)

CCSDS 650.0	Reference Model for an Open Archival Information System (OAIS) http://public.ccsds.org/publications/AllPubs.aspx

DCMI

	DCMI Metadata Terms http://dublincore.org/documents/dcmi-terms/

ISO

ISO 14721	Space data and information transfer systems – Open archival information system (OAIS) – Reference model, Second Edition http://www.iso.org/
ISO 15489-1	Information and documentation – Records management – Part 1: General http://www.iso.org/
ISO 15836	Information and documentation – The Dublin Core metadata element set, Second Edition http://www.iso.org/
ISO 16363	Space data and information transfer systems – Audit and certification of trustworthy digital repositories, First Edition http://www.iso.org/
ISO/TR 15489-2	Information and documentation – Records management – Part 2: Guidelines http://www.iso.org/
ISO/TR 15801	Document management – Information stored electronically – Recommendations for trustworthiness and reliability http://www.iso.org/

SMPTE

Standard 377-1	Material Exchange Format (MXF) File Format Specification http://standards.smpte.org/