Office of the Chief Information Officer
NASA Aeronautics and Space Administration

NASA TECHNICAL STANDARD

NASA-STD-2822
Approved: 2024-11-19

NASA IMAGERY PROCEDURE AND METADATA STANDARD

Version 2.0 2024-11-19

DOCUMENT HISTORY LOG

Status	Document Revision	Change Number	Approval Date	Description
Baseline			2013-09-03	Initial Release
Final	Version 2.0		2024-11-19	Updated to include new processes, procedures, recommendations and requirements

FOREWORD

This NASA Standard is published by the National Aeronautics and Space Administration (NASA) to establish requirements, responsibilities, and procedures to assist NASA organizations and contractors with capturing, cataloguing, and archiving image records as per NASA Procedural Requirement (NPR) 1441.1, NASA Records Management Program Requirements.

Authoring of this standard was a group effort led by Barbara Lambert, as chief contributor and writer. Her authoring team consisted of dedicated individuals who shared their expertise on various subjects. They are Maura White, William Close, and Josiel Torres.

Submit requests for changes to this Standard via Marshall Space Flight Center (MSFC) Form 4657 or email feedback to Maura White at maura.white-1@nasa.gov.

November 19, 2024

Josiel Torres
NASA Imagery Experts Program Manager
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Approval Date

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NASA IMAGERY PROCEDURE AND METADATA STANDARD

1. SCOPE

This document establishes requirements, responsibilities, and procedures to assist NASA organizations and contractors with capturing, cataloguing, and archiving image records using core metadata sets that ensure compliance with the National Archives and Records Administration (NARA) implemented via NPR 1441.1.

1.1 Purpose

NASA and its predecessor, the National Advisory Committee for Aeronautics (NACA), have managed and retained image records since 1917. NASA and its affiliates, like all Federal agencies, have a requirement (44 U.S. Code § 3101) to provide safekeeping of records that document the Agency's mission and to transfer permanently valuable records to NARA based on record retention schedules and as approved by NARA. The purpose of this NASA Technical Standard is to establish standard procedures and identify requirements for imagery captured in support of the Agency.

1.2 Applicability

1.2.1 This standard applies to all NASA Centers and affiliates that support imagery tasks and for NASA projects and/or programs that manage and retain image records. **RQ_001** NASA personnel and contractors capturing imagery while conducting official government activities on behalf of NASA shall adhere to the requirements identified in this document. This requirement applies to every individual and/or entity capturing imagery in an official capacity.

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

NASA Centers and affiliates are responsible for implementation and enforcement of these requirements. The requirements will take effect one year after this document is released. Compliance is not required for imagery captured and catalogued prior to the effective document release date.

1.2.3 References to "this Standard" refer to NASA-STD-2822; references to other documents state the specific document information.

1.2.4 In this document, requirements are identified by the prefix "RQ" followed by a unique number: e.g., RQ_001. Recommendations are identified by the prefix "REC" followed by a unique number: e.g., REC_001. Appendix A contains a complete list of the requirements and their location in this document. Appendix B contains a complete list of the recommendations and their locations.

1.2.5 In this document the terms "may" or "can" denote discretionary privilege or permission, "should" denotes a good practice and is recommended but not required, "will" denotes expected outcome, and "is/are" denotes descriptive material or a statement of fact. The term "shall" denotes mandatory action (i.e., requirements).

1.3 Tailoring

Any decision to waive or vary from requirements in this Standard requires concurrence from NASA's Imagery Experts Group (NIEG) Configuration Control Board (CCB). **RQ_002** Tailoring for application to a specific program or project shall be formally documented as part of a program or project requirement and approved by the NIEG CCB.

1.4 Authority

51 U.S.C. § 20113, National Aeronautics and Space Act

1.5 Measurement/Verification

Each program/project will define how to validate successful implementation of imagery processes and requirements as outlined in this document.

1.6 Training

Program, project, and mission managers are responsible for ensuring personnel performing photo and/or video tasks are fully trained in accordance with the procedures and processes outlined in this Standard as well as center procedural requirements and project photo/video documentation plans.

Refer to NASA's Still and Motion Imagery Handbook for detailed training requirements.

1.6.1 Personal Safety Training

Personnel responsible for capturing still or motion imagery will comply with applicable center and project safety requirements and be briefed on personal safety for the facilities and environments in which work is performed. Each individual is responsible for coordinating with their respective project or program safety officer to ensure all mandatory training and certifications have been completed prior to performing work.

1.6.2 Hardware and Facilities Training

Personnel working on or around flight hardware will be cognizant of all safety requirements specific to that hardware and practice situational awareness to mitigate environmental, structural, electrical, and/or mechanical impacts or personal mishaps or injury.

1.6.3 Imagery Process Training

Supervisors should ensure that photographers/videographers understand this Standard, the appropriate center's guidance and/or procedure requirements, and their respective project's photo documentation plan (see section 6.1 and 6.2) if applicable. Functionality of the image archive database and an emphasis on record management and archival processes should also be included.

1.6.4 Facility Access Training

Each center or organization has specific training required for access to and work performed in their various facilities. Program, project, and mission managers are responsible for ensuring all individuals capturing imagery receive facilities training and maintain certifications as required.

2. APPLICABLE DOCUMENTS

2.1 General

2.1.1 Documents listed in this section contain provisions constituting the requirements of this Standard as cited in the text. Latest issuances of cited documents apply unless specific versions are designated. Obtain approval from the delegated NASA Technical Authority to use a version other than as designated.

2.1.2 Access applicable documents at https://standards.nasa.gov or directives/requirements documentation at https://nodis3.gsfc.nasa.gov/main_lib.cfm or obtain documents directly from the Standards Developing Body, other document distributors, information provided or linked, or by contacting the office of primary responsibility for this Standard.

2.2 Government Documents

NASA

NPD 1440.6, NASA Records Management
NPR 1441.1, NASA Records Retention Schedules
NPR 2190.1, NASA Export Control Program
NPR 7120.5, NASA Space Flight Program and Project Management Requirements
NPR 7120.8, NASA Research and Technology Program and Project Management Requirements
NPR 8705.4, Risk Classification for NASA Payloads
NASA STD-2818, Digital Television Standards for NASA

SSP 50502, International Space Station Hardware Preflight Imagery Requirements
NASA Stylebook Rev 9 - June 2020

Federal Government

44 USC. Chapter 33, Disposal of Records
Title 36 CFR Part 1237, Electronic Code of Federal Regulations, Audiovisual, Cartographic, and Related Records Management

2.3 Non-Government Guidance

NIEG maintains awareness of DCMI activities, practices, and innovations related to metadata and imagery, which may apply to NASA imagery products.
U.S. 501 (c)(3) Dublin Core Metadata Initiative (DCMI)

2.4 Order of Precedence

2.4.1 The requirements and standard practices established in this Standard do not supersede or waive existing requirements and standard practices found in other Agency documentation.

2.4.2 Conflicts between this Standard and other requirements documents will be resolved by the delegated NASA Technical Authority.

3. ACRONYMS and DEFINITIONS

3.1 Acronyms

ALT	Alternate
AO	Announcement of Opportunity
AFRC	Armstrong Flight Research Center
ARC	Ames Research Center
CAIB	Columbia Accident Investigation Board
CFR	Code of Federal Regulations
CIL	Critical Items List
CUI	Controlled Unclassified Information
CUI//SP-EXPT	Controlled Unclassified Information/Special-Export Controlled
DCMI	Dublin Core Metadata Initiative
EAR	Export Administration Regulations
FPD	Flight Projects Directorate
GISS	Goddard Institute of Space Studies
GPR	Goddard Procedural Requirement
GRC	Glenn Research Center
GRS	General Records Schedule
GSE	Ground Support Equipment
GSFC	Goddard Space Flight Center

Handbook	NASA Still and Motion Imagery Handbook
HQ	Headquarters
IT	Information Technology
ITAR	International Traffic in Arms
ISO	International Organization for Standardization
IV&V	Independent Verification and Validation Facility
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
KDP	Key Decision Point
KSC	Kennedy Space Center
LRC	Langley Research Center
MAF	Michoud Assembly Facility
MSFC	Marshall Space Flight Center
NAI	NASA Astrobiology Institute
NARA	National Archives and Records Administration
NASA	National Aeronautics and Space Administration
NIEP	NASA Image Experts Program
NIST	National Institute of Standards and Technology
NLSI	NASA Lunar Science Institute
NPD	NASA Policy Directives
NPR	NASA Procedural Requirement
NRRS	NASA Records Retention Schedule
OCIO	Office of Chief Information Officer
PR	Procedural Requirement
QE	Quality Engineer
REC	Recommendation
RQ	Requirement
SMPTE	Society of Motion Picture & Television Engineers
SSC	Stennis Space Center
SSP	Space Station Program
STSCI	Space Telescope Science Institute
USC	United States Codes
WFF	Wallops Flight Facility
WSTF	White Sands Test Facility
WOA	Work Order Authorization

3.2 Definitions

Archive: For purposes of this document, the permanent storage for a collection of items at the end of a project life cycle, typically at the National Archives and Records Administration.

Close-Out Photo: Typically, a higher resolution image of a subsystem or area of interest in its final flight configuration prior to being enclosed or blanketed thereby obscuring visual access at

a later time. An image of high resolution taken to document hardware configuration at the completion of manufacture/assembly and/or just prior to launch.

Critical Items List: A listing of components and their failure modes which, if they fail in one of the potential modes identified in the failure modes and effects analysis (FMEA), could result in loss of vehicle, life, or mission. The CIL also includes items that could fail in one mode and result in loss of redundant systems capability, items whose failure mode is not readily detectable in flight, and redundant systems in which a single failure may result in loss of the total system capability.

Ground Support Equipment: For the purpose of this document, the nonflight equipment, systems or devices specifically designed and developed for a physical or direct functional interface with flight hardware. Critical GSE is that GSE whose loss of function or improper performance could result in serious personnel injury, damage to flight hardware, loss of mission, or major damage to a significant ground asset. Can be more specifically defined as Electrical (EGSE) or Mechanical (MGSE).

Imagery: Visually descriptive or figurative language to represent objects, actions, or ideas (photos, illustrations, animations, etc.).

Manned Operational Ground Equipment: Flight operational ground equipment that is supported by a 24x7 operational staff at the equipment location.

Program: A strategic investment by Mission Directorates or mission support offices that has a defined architecture and/or technical approach, requirements, funding level, and management structure that initiates and directs one or more projects. A program implements a strategic direction that the Agency has identified as needed to accomplish Agency goals and objectives.

Project: A specific investment identified in a Program Plan having defined requirements, a life-cycle cost, a beginning, and an end. A project also has a management structure and may have interfaces to other projects, agencies, international partners, and commercial entities. A project yields new or revised products that directly address NASA's strategic goals.

Record: All books, papers, maps, photographs, machine readable materials, or other documentary materials, regardless of physical form or characteristics, made or received by an agency of the United States Government in connection with their business transactions and preserved or appropriate for preservation as evidence of the organization, functions, policies, decisions, procedures, operations or other activities of the Government or because of the informational value of the data in them (see NRRS 1441.1).

Storage: For purposes of this document, the database or area on a server or other designated device where a collection of items/images are kept for search and retrieval. Typically, this is an integrated module within a project's management information system.

Unmanned or Limited Support Operational Ground Equipment: Flight operational ground equipment that is not supported by a 24x7 operational staff at the equipment location.

4. OVERVIEW

4.1 General Guidance

Imagery is captured for a variety of reasons to satisfy both immediate and ongoing requirements. Digital imagery provides a readily accessible visual history, and as such needs to be accurately and thoroughly described and placed within a context of time, place, and purpose. It also needs to reside within a searchable, retrievable content management system within the organization, such that personnel with appropriate security levels have access. The more thoroughly the imagery is described, the greater the operational value and the more efficiently it can be retrieved.

This Standard establishes requirements and best practices to ensure standardization among all NASA Centers and its affiliates. It also identifies necessary metadata and is intended to be the foundation for the management and retention of all NASA image records. The metadata standards described herein comply with DCMI specifications (DCMI: Specifications (dublincore.org). For this Standard, an image record refers to all 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, decisions, procedures, operations, or other NASA activities or because of the information value of data captured within the image record (44 U.S.C Chapter 33, Disposal of Records). Refer to NPR 1441.1, for clarification of the image record type and retention.

4.2 Background

In March 2005, NASA's Office of the Chief Engineer chartered a Digital and Closeout Photography Team led by the Policy, Assessment, and Integration Department of the Safety and Mission Assurance Office at Marshall Space Flight Center to address the recommendations from the Columbia Accident Investigation Board (CAIB) and the Diaz team related to the use of closeout photographs for space flight and ground systems hardware.

The CAIB observations reflected a concern that NASA practices for documenting hardware closeouts and as-built configurations were inconsistent, and irregularities existed between the procedures that governed this process and actual practices. The CAIB also observed that the collected photographs and related data were not formatted in a manner that facilitated ready recall of the information required to support real time decision-making processes.

The reports of the CAIB, Diaz team, Action Digital Closeout Photography Assessment Team and other documents were considered in developing the requirements and guidelines provided herein. The example mentioned here is specific to flight closeout photography, however the observations and recommendations of the committee are applicable to imagery documentation across the Agency.

4.3 NASA Image Experts Program

NASA's Imagery Experts Program (NIEP) consists of NASA's Imagery Experts Program Office, located within the Office of the Chief Information Officer (OCIO), and the NIEG. The NIEG consists of the Still Imagery and Video working groups and includes representatives from each NASA Center, Headquarters, Jet Propulsion Laboratory, Office of Communications, and Web-Services Office. The chair of the NIEG is provided by the OCIO. The NIEP provides policy, dissemination, planning, technical expertise, and leadership in the application of developing still and video imagery technologies for public dissemination, science, and engineering for both terrestrial and space-flight applications. In conjunction with the OCIO, NIEP leverages NASA's telecommunications and networking infrastructure for public and private dissemination of imagery products. This program develops standards and guidance for imagery records produced for and maintained by NASA. This metadata standard developed by this entity outlines requirements and guidance towards that objective.

5. CENTER OF RECORD

According to NASA Policy Directive (NPD) 1440.6, it is NASA policy to:

(1) Accurately and completely make and preserve records containing documentation of the organization, functions, policies, decisions, procedures, and essential transactions that protect the legal and financial rights of the Government and persons directly affected by Agency activities as required by the Federal Records Act, 44 U.S.C. § 3101 et seq.

(2) Identify, preserve, and protect records, including temporary records, permanent records, and vital records, against loss, theft, unauthorized release or change, as well as dangers posed by armed conflict, natural and human-made disasters, or other emergencies. This protection will ensure continuity of operations during and after an emergency, enabling the Agency to perform emergency preparedness, response, and recovery and to protect Agency personnel and assets.

(3) Protect the trustworthiness of records, including their reliability, authenticity, integrity, and usability to meet Agency internal business and legal needs, as well as external regulations and requirements.

(4) Effectively and efficiently manage Agency records, regardless of format or media (including paper, microform, electronic, and audiovisual), throughout their life cycle in order to facilitate the Agency's programmatic and administrative missions.

(5) Preserve, maintain, and disposition NASA records in accordance with NASA Records Retention Schedules (NRRS) 1441.1, and/or National Archives and Records Administration's (NARA) General Records Schedules. Destruction of any records, regardless of format, without an approved schedule is a violation of Federal law.

NPD 1440.6 states the responsibilities for Center Records Managers as required to:

(1) Implement and oversee the Records Management Program at their respective Centers.

(2) Coordinate the activities of Records Liaison Officers within their Centers.

(3) Provide advice on the management of records throughout their full life cycle, including appropriate and adequate storage and proper records scheduling and disposition.

(4) Consult with Records Liaison Officers and Center employees regarding their responsibilities.

(5) Communicate regularly and effectively with customers, Records Liaison Officers, and the Agency Records Officer concerning updates, changes, and issues in records management and electronic records.

(6) Ensure the provision of supplemental Center records management training, as necessary.

(7) Gather and provide input to the Agency Records Officer documenting any unauthorized removal or destruction of records.

6. OVERALL PROCESS AND PROCEDURAL RECOMMENDATIONS

6.1 Center Level Recommendations

REC_001 Each NASA center should develop an imagery guidance or procedural requirements document based on the recommendations and requirements contained herein (reference examples in the handbook).

This guidance, or procedural requirements document should direct programs and projects to generate their own respective Photographic and Video Documentation Plans that include specifics for capturing, cataloguing, maintaining, and archiving images and associated metadata. The Center level guidance and these project plans will ensure compliance with established agency processes, procedures, and standards as defined herein. Centers may develop templates to assist with generating these documents.

6.2 Program/Project Level Recommendations

REC_002 Projects should generate photo/video documentation plans that align with this Standard and their respective center's guidance document (reference 6.1 above) and include specific photographic requirements pertinent to their mission (reference example in the handbook).

Program/project imagery plans should include but not be limited to:

a. Determining processes and procedures for capturing, identifying, cataloging, and storing imagery for critical phases of Engineering Test Unit and flight hardware (and

GSE where applicable) development through the life cycle of the project, (including vendor imagery where applicable) and including these procedures in a controlled standalone document to reside in the project's library or filed with the project records manager.

b. Identification and maintenance of a search and retrievable content management system to contain still and video imagery and associated metadata for the life of the project.
c. Identification of items subject to International Traffic in Arms Regulations (ITAR) Export Administration Regulations (EAR), Classified, or Controlled Unclassified Information (CUI) restrictions
d. A process for evaluating the effectiveness of the procedures. Management controls should be included to ensure that documented procedures are successfully implemented (reference Section 1.5, Measurement/Verification).

6.3 Camera Devices

When capturing still or motion imagery in support of NASA missions and contracts, only approved, non-personal camera devices are acceptable for use.

NPD 2540.1K, Section F, (Numbers 16, 19-21) Acceptable Use of Government Furnished Information Technology Equipment, Services and Resources, reference all requirements for NASA information technology (IT) users, including:

- Not connect any personal device, used wholly and entirely for personal use, to NASA network when they are on the premises of a NASA Center, facility, campus, or any type of NASA property.
- Not use personally owned equipment to access NASA IT, except as explicitly authorized by NASA's CIO.
- Not connect unauthorized non-NASA devices to NASA IT via Universal Serial Bus (USB), Bluetooth, or any other connection methods.
- Not connect NASA IT via any method to any non-NASA IT that provides data storage, including, but not limited to USB or "thumb drive" external storage devices, external hard drives, smartphones, tablets, and cameras.

RQ_003 Due to export control and intellectual property concerns and photo quality considerations, photos shall only be taken using NASA approved devices. The use of personal cameras and/or non-approved camera devices is forbidden except in extraordinary cases, with documented authorization from project management (or higher).

RQ_004 In such circumstances, photos taken with a personal device shall comply with requirements in this directive as well as all ITAR, EAR, Classified and CUI restrictions; be transferred immediately to the project's database management system for cataloging and storage, and deleted from the personal device.

NOTE: Personal devices include personal cell phones and tablets.

Approved devices are those whose design is specific to capturing still and/or motion imagery. Examples of approved and non-approved devices are listed in the table below. This list is not comprehensive, only an example. Refer to your center's Procedural Guidance documentation or project's photo documentation plan for additional information.

Approved Devices	Non-Approved Devices
Point and shoot cameras	Personal cell phone cameras
Digital Single Lens Reflex (DSLR) Cameras	Personal Tablets
Video camcorders	Personal Ipads
Approved IP cameras	Computer devices with image capture capability
Scanner	

REC_003 The procedures outlined in each program/project's photo plan should identify the acceptable camera/video devices, acceptable image resolution, and describe a process for equipment control and maintenance.

Any still or motion imagery captured by anyone other than the official NASA photographer/videographer with the intent to use for official government business will adhere to these requirements.

6.4 Duplication of Effort

REC_004 In an effort to streamline services and maintain consistency within a center or agency, it is highly recommended that projects requiring photographic and/or video services coordinate with their center/agency Contracting Officer and their center's NIEG CCB member to evaluate and ensure they are not violating existing contracts with similar support.

Duplication of effort occurs when two or more entities (people, organizations, groups) make the same effort to do a similar task. It can lead to a waste of resources and overwhelm or distort local capacities.

To prevent the occurrence, the contractor must certify that costs for work to be performed under the contract and any subcontract are not duplicative of any costs charged against any other Government contract, subcontract, or other Government source. The contractor agrees to advise the Contracting Officer, in writing, of any other Government contract or subcontract it has performed or is performing which involves work directly related to the purpose of the contract.

See 48 CFR § 1352.231-71 – Federal Acquisition Regulation System, Duplication of effort for more information.

6.5 Procurements

6.5.1 Procuring Photo or Video Services

When required photo/video services fall outside of the scope of the current contract/NASA capability, an off-site service may need to be secured. Procuring this service would not be considered a duplication of effort. For example, if large quantities of print products are needed outside of the scope of what any NASA center can provide, the Government Publishing Office (GPO) may be used. The applicable center printing officer can provide guidance on procuring services from GPO.

6.5.2 Procuring Photographic Equipment

Photographic and video production equipment should only be purchased by organizations contracted by NASA to provide those services. Organizations are discouraged from buying or leasing their own equipment since such purchases could be viewed as a duplication of effort. NASA contracted imagery personnel should be contacted first because they have undergone extensive training and understand the requirements and nuance for providing imagery services. Furthermore, photo and video equipment is considered IT. Program managers will ensure that cameras and camera cards have completed the pre-approval Supply Chain Risk Management (SCRM) process before the equipment is connected to NASA's network.

7. PROGRAM/PROJECT PHOTOGRAPHY

The program/project's photo documentation plan is an official mission/project document and should be filed accordingly. At a minimum, the program/project configuration manager should solicit reviews from the following personnel as they will be responsible for implementing compliant photo/video processes.

- Project/Program Manager or Deputy
- Safety and Mission Assurance Manager
- Integration and Test Manager
- Photographer/Imagery Representative (NIEG Member)
- Configuration Manager (if applicable)

Program, project, and mission managers will ensure that imagery requirements are passed through to contractors, as applicable.

REC_005 Contractors should follow the guidance and metadata conventions described throughout Section 8.4. Proprietary imagery should be accurately identified, and access controlled as per vendor requirements.

Responsible engineers and/or photographers should handle sensitive imagery received from off-site vendors/contractors in accordance with the program/project photo documentation plan. Upon release of the photo plan, the project/program manager will inform all team members of this document to ensure compliance. Sample mission plans can be found in the handbook.

7.1 Risk Assessment and Level of Effort

The Mission Directorate designates the mission or instrument risk tolerance class as early in the formulation process as possible (e.g., Announcement of Opportunity). There are four distinct risk tolerance classes that provide projects with a uniform authoritative source of Agency-level assurance expectations from which managers, technical authorities, engineers, etc., can develop, communicate, and implement appropriate mission assurance and risk management strategies and requirements consistent with corresponding NASA assurance standards.

Risk tolerance should be considered when determining the level of effort applied for imagery documentation. For instance, projects/missions with a low risk tolerance should secure more in-depth photo documentation coverage to capture all milestone events and major activities throughout the lifecycle of the project/mission. Projects/missions with a higher risk tolerance may employ less coverage appropriate to their higher risk posture and limited resources. Regardless of risk classification/risk tolerance, all projects/missions will adhere to policies and procedures identified herein.

7.1.1 Risk Tolerance Classes

Class A: The lowest risk tolerance that is driven more by technical objectives. This would normally represent a very high priority mission with very high complexity.

Class B: Low risk tolerance that is driven more by technical objectives. This would normally represent a high priority mission with high complexity.

Class C: Moderate risk tolerance that is driven more by technical objectives. This would normally represent a medium priority mission with medium complexity.

Class D: High risk tolerance that is driven more by programmatic constraints. This would normally represent a lower priority mission with a medium to low complexity.

Refer to NPR 8705.4 for more details.

NOTE: All projects/missions will adhere to the procedures and processes outlined in this document regardless of risk classification/risk tolerance.

7.2 Work Orders

REC_006 The project/program manager should identify in the photo plan when photos should be taken and document these requirements in their work statements/work orders. This ensures that critical steps throughout the activity are visually documented within the window of opportunity.

REC_007 The program/project's photo documentation processes should be described in the photo plan and should enable traceability between a work statement/work order and the image records they support.

REC_008 The originator's closure/review of the work order should include verification that required stills and/or motion imagery have been taken, that the imagery resides in the program content management system and that any deviations to the work order/statement are noted.

RQ_005 Imagery associated with official NASA work statements/orders are considered official records. Imagery records shall contain, at a minimum, a core set of metadata (reference section 8.4) and follow the NRRS 1441.1 guidance.

NOTE: Image capture is not limited to activity regulated through official work orders or other documented photographic or video requests.

7.3 Flight Hardware Imagery

Recommendations for final close-out imagery of flight hardware includes:

REC_009 When conducting activity that will restrict visibility of an item or configuration, the work statement/work order should include verbiage such as "Subsequent steps should not be executed until close-out imagery has been taken."

REC_010 Authorization to proceed without obtaining required imagery should be considered a "deviation" from the approved work statement/work order and requires action in accordance with the project's policy regarding deviations.

REC_011 For projects that include development of human-rated space flight hardware, photographic documentation procedures should incorporate additional requirements, such as those contained in the International Space Station Hardware Preflight Imagery Requirements Document, SSP 50502.

RQ_006 Minimum image resolution and image formats shall comply with National Archives and Records Administration (NARA) regulations. (Reference NARA approved file sizes and formats at https://www.archives.gov/records-mgmt/initiatives/digital-photo-records.html)

7.3.1 Hardware Activities or Items to Be Documented

REC_012 At a minimum, the program/project/mission managers should include the following activities or items for still and/or motion imagery in photo documentation or project management plans:

a. Waivers or deviations to actions that change the "as built" configuration
b. Identification markings (decals, serial numbers, model numbers, part numbers)
c. Views before and after external blankets, insulation, or other obscuring layers are removed or installed for flight close-outs.

As a best practice, programs/project should consider including a list of key milestone activities and specific flight hardware components in their plans for the benefit of the engineers, technicians

and photographers. This list could be used as a reference to keep abreast of schedule and mitigate the possibility of missed opportunities. Refer to the detailed list in the handbook.

8. RECORDS MANAGEMENT

All Federal agencies are required by law and Agency policy to maintain and preserve records. The heads of Federal agencies are responsible for preventing any unlawful alteration, removal, or any accidental or unauthorized destruction of records. Records (or Federal records) are defined in 44 U.S.C. §3301 as "all books, papers, maps, photographs, machine readable materials, or other documentary materials, regardless of physical form or characteristics, made or received by an agency of the United States Government under Federal law or in connection with the transaction of public business and preserved or suitable for preservation by that agency or its legitimate successor as evidence of the organization, functions, policies, decisions, procedures, operations or other activities of the Government or because of the informational value of the data in them."

8.1 Permanent and Temporary Records

A permanent record is any Federal record of such historical significance as to warrant NARA's authorization of its preservation in the National Archives beyond the time that it is needed for NASA administrative, legal, or fiscal purposes. Permanent records are indicated as such in the NRRS with a permanent disposition authority. Examples of permanent records are those of senior NASA managers specified in NRRS 1/item 22.A.1. All such records will be accessioned by NARA into the National Archives for preservation for the life of the Republic.

A temporary record is any record which has been determined by the Archivist of the United States to have insufficient value (on the basis of current standards) to warrant its permanent preservation by the National Archives. Temporary records are approved by NARA for disposal after a specified retention period which is provided in the NRRS. This does not mean that a temporary record may, by default, be destroyed immediately.

8.2 Disposition of Imagery Records and NARA

All NASA records should be dispositioned in accordance with NRRS 1441.1 or the General Record Schedule (GRS) by Record Custodians or Record Owners.

NRRS 1441.1 provides records descriptions and retention/disposition instructions for records unique to NASA. These retention schedules are approved by the Archivist of the United States and provide legal authority for disposition of the records. The schedules provide titles, descriptions, retention/disposition instructions, and the disposition authority for a series of NASA records.

8.3 Freedom of Information Act (FOIA)

All FOIA requests must go through the Agency or center FOIA office. All permanent records that fall within the guidelines are subject to FOIA requests. Responses to the requests must be made within the timeline given by the FOIA office.

8.4 Metadata

8.4.1 Core Metadata Set and Elements

RQ_007 All NASA image records shall include, at a minimum, the core metadata set as outlined in Appendix D. Additional elements, though not required, are highly recommended for more comprehensive cataloging.

The core metadata set is the minimum complement of required metadata elements for NASA image records necessary to meet NARA standards for Federal records retention (Electronic Code of Federal Regulations, Title 36, part 1237 Audiovisual, Cartographic, and Related Records management). Organizations responsible for the management and retention of NASA image records may use as many metadata elements as they elect, as long as the minimum core set is included. For a list of the Dublin Core elements and examples see Appendix D.

RQ_008 Metadata shall be associated with all imagery to support cataloging, search, and retrieval. Consistency of metadata is encouraged among the projects.

RQ_009 When an image record is converted, digitized or transformed into a new image record, the original metadata, descriptors, and file names shall be retained in the new image record's metadata.

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

8.4.2 File Naming Convention - Metadata Fields

8.4.2.1 NASA Center

RQ_010 the Center location or affiliate site shall be the center of record for that image. as indicated below:

Center	**Acronym**
Ames Research Center	ARC
Armstrong Flight Research Center	AFRC
Glenn Research Center	GRC
Goddard Institute of Space Studies	GISS
Goddard Space Flight Center	GSFC
Independent Verification and Validation Facility	IV&V Facility
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	HQ
NASA Lunar Science Institute	NLSI
Space Telescope Science Institute	STSCI
Stennis Space Center	SSC
Wallops Flight Facility	WFF
White Sands Test Facility	WSTF

8.4.2.2 Date

RQ_011 The date the image record was acquired shall be written as year, e.g., 2013, or as year/month/day, e.g., 20130529.

RQ_012 When the image record file format is changed or is migrated to a new storage medium, the date shall not be changed.

8.4.2.3 Item Number

RQ_013 The Item Number shall be a unique sequential number per calendar year for each image record.

8.4.3 File Naming Convention – Creating the Unique Identifier

RQ_014 A unique image record identifier shall be used for each image record. The intent of the unique identifier is to assign at a minimum, a center, year, and numeric value for each image.

RQ_015 When an image record is transferred between organizations, the image unique identifier shall not be changed.

RQ_016 The unique identifier for permanent records shall at a minimum, follow the format:

where "**AAAA**" is the NASA center of origin, *YYYY* is the four-digit year, and XXX.... is a sequential number of any length. Each new calendar year the sequential numbering starts over with the number "1" (i.e. GSFC_2024_001**...**) See Section 8.4.2.1 for a list of Center identifiers.

Although not a requirement, missions may also elect to follow the above format for temporary records as well.

Additional options for unique identifiers:

a. Optional formatting for the date may include the month and day in this format:
YYYYMMDD (i.e. GSFC_20200911_123...)

b. Optional formatting for adding a proj/mission name would be:
AAAA *YYYY*_PROJ_XXX… (*i.e.* GSFC_20200911_PACE_123)

c. Optional – use of a Media Identifier
The media identifier 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.

Media Type (optional): *Select from the following if applicable:*

a - animation	as - analog still
e - electronic still	m - motion/movie/video
g - graphic	hs - high speed

Examples for using these additional options in a unique identifier:

Center	Date	Media ID	Project/ Mission	Item #	File Name
GSFC	20220830	-	MSRCCRS	001370	GSFC_20220830_MSRCCRS_001370
GSFC	20220421	"e"	PACE	302520	GSFC_20220421_ePACE_302520
JSC	2012	"e"	--------	226645	JSC2012e226645
KSC	20220614	PH-CSH01	--------	0044	KSC-20220614-PH-CSH01_0044

8.5 Back-Up Protocol

NASA requirements for protecting the security of NASA information and information systems are derived from National Institute of Standards and Technology (NIST) guidance. Information System Owners (ISOs) and other personnel responsible for the protection of NASA information or information systems should follow NIST guidance.

1. Refer to your center or agency OCIO for data storage requirements.
2. Ensure you have a system in place for automated and/or regularly scheduled backups. Periodically test the system for accuracy.

Reference for HBK-2810.08.01 https://cset.nasa.gov/ascs/cspd-handbooks/.

9. BEST PRACTICES

9.1 NASA Imagery Editing Guidance

9.1.1 Prohibition on Misleading Alterations

NASA civilian and contractor personnel who produce, edit, and/or release visual information must maintain credibility when presenting visual imagery and information to the public.

Any NASA or contractor photograph that is altered to deliberately mislead or deceive the public, media, or U.S. government is strictly prohibited. **RQ_017** All personnel involved in the creation of NASA visual information shall work to meet the highest ethical standards followed by the Agency, the news industry, and other visual dissemination media.

9.1.2 Acceptable Adjustments to Images

As visual IT advances, it is imperative that NASA and contractor photographers maintain integrity by presenting imagery and other visual information as an accurate recording of a scene or event. Accepted industry practice allows for adjustments to images, such as color correction, exposure correction, and removal of dust spots, to ensure an accurate reproduction of the original scene. Editing of images beyond this should not happen, except in the rare instances when photographing around something or cropping cannot be avoided.

Exaggerated use of adjustments, such as heavy dodging, burning, and color saturation, should be avoided. Image cropping in a way that alters the context or misrepresents the scene or event is not allowed. Digitally adding or removing elements of an image constitutes misrepresentation and is prohibited.

9.1.3 Studio Images

All photo illustrations, portraits, and images produced in a studio environment should not mislead the viewer into believing they were spontaneous events. Composite images and photo illustrations should be clearly identified as such in the first sentence of the caption. Additionally, if a specialized method of image capture, such as a digital camera modified for infrared photography is used, denote the method used in the first sentence of the caption as well.

Examples of captions noting specialized methods:

> In this black and white infrared image, the Soyuz MS-09 rocket is launched with Expedition 56 Soyuz Commander Sergey Prokopyev of Roscosmos, flight engineer Serena Auñón-Chancellor of NASA, and flight engineer Alexander Gerst of ESA (European Space Agency), Wednesday, June 6, 2018, at the Baikonur Cosmodrome in Kazakhstan. Prokopyev, Auñón-Chancellor, and Gerst will spend the next six months living and working aboard the International Space Station. Photo Credit: (NASA/Joel Kowsky)

This composite image made from six frames shows the International Space Station, with a crew of six onboard, as it transits the Moon at roughly five miles per second, Saturday, Dec. 2, 2017, in Manchester Township, York County, Pennsylvania. Onboard are: NASA astronauts Joe Acaba, Mark Vande Hei, and Randy Bresnik; Russian cosmonauts Alexander Misurkin and Sergey Ryanzansky; and ESA astronaut Paolo Nespoli. Photo Credit: (NASA/Joel Kowsky)

9.1.4 Sensitive information

In rare instances where ITAR sensitive or proprietary hardware, or personally identifying information (PII), such as employee badges, are visible and cannot be cropped out or captured in such a way as to be avoided, it is permitted to blur those items. This editing should be done as minimally as possible across the image and should be clearly identified in the caption in plain language, i.e.: "NOTE - Sensitive technical details have been digitally obscured in this photograph." Whenever possible, photographers should make an effort to compose images in a way that does not show sensitive or proprietary information that would require portions of an image to be digitally obscured. (Reference NASA Stylebook and Communications Manual https://www.archives.gov/records-mgmt/initiatives/digital-photo-records.html)

9.2 Still Imagery Best Practices

Metadata collection begins when the customer requests support. The photographer/videographer or assigned designee should gather all information to assist with the acquisition of the imagery. The responsible engineers should inform the photographer/videographer of all applicable export control or proprietary restrictions for the subject matter (see Appendix C for core metadata sets).

Photographers and videographers may choose to adjust metadata settings in the camera such as the file name and image comment, along with time and date, to ensure accurate data is associated with the image file. Creating records without knowing the retention policy ahead of time greatly increases the risk of generating large amounts of imagery data that must be retained until its lifecycle is understood. Retrofitting of metadata is usually a more laborious and uncertain process for imagery data. Unless otherwise directed, the photographer should set the still image file format to camera RAW. Audio tags may be used to capture additional information such as names, locations, items, a process, or part numbers.

RQ_018 The photographer or technician shall rename the permanent record according to the unique identifier requirements as outlined in section 8.4.3 and apply the appropriate sensitivity label.

Data captured with audio tags should accompany the images in the repository.

Post capture, the photographer or technician should research and include any missing metadata. Once customer requirements have been met, the photographer or technician should enter the

imagery, metadata, and proper retention schedule into the appropriate database system for distribution, retention, and possible transfer to NARA (see Section 1.1).

Audio files recorded during image capture are not considered permanent records and may be discarded after use.

Digital motion imagery is captured using many different cameras and/or recorders and saved in a variety of file formats. The photographer/videographer should select a workflow (i.e. MXF) that will allow for the direct importation of additional information, such as the task name, creator and location. After the imagery is ingested into a secured storage area, the photographer/videographer may add additional metadata and tags during post-production to streamline search and retrieval efforts (see Section 8.4 of this Standard)

Motion imagery may be transcoded into appropriate formats as necessary for distribution to the customer as well as accession to NARA. These additional files, deemed copies rather than records, are often saved in a Media Asset Management system making them available for future productions.

10. PHOTOGRAPHIC CATEGORIES AND IMAGERY MODIFICATIONS

Imagery should be retained in its original format. If an image needs minor alterations to meet customer requirements or to obscure sensitive information, the photographer or technician should save the modified image file separately with an underscore “ALT” in the file name. (_ALT). This satisfies NASA Image Editing guidance.

For specific processes and procedures including use of portraits and flags, resolution, retouching etc. refer to NASA’s Still and Motion Imagery Handbook.

11. ACCESS RESTRICTIONS

To ensure compliance with U.S. export control laws and regulations, the Departments of State and Commerce both strongly advise that exporters and manufacturers have processes in place that assist in managing and monitoring export-controlled activities. Access to hardware imagery may be subject to restriction under two regulations: ITAR, which controls the export of goods and technical data on the U.S. Munitions List, and EAR, which controls the export of goods and technology on the Commerce Control List (NPR 2190.1C).

11.1 Export Control

Access to and release of imagery will comply with the requirements of NPR 2190.1, NASA Export Control Program. The program manager should contact the Export Control office prior to

hardware development and image capture to discuss a process for image release. The responsible engineer should note classification on the test plan/work order/job description and notify the photographer/videographer.

11.2 Delivery and Use of Controlled Imagery

RQ_019 Approved and secure methods of storage and transfer shall only be used as referenced in NIST SP 800-53.

Images identified as Controlled Unclassified Information (CUI) are for internal use only and not for public release unless they have been officially reviewed by export control officers and written approval for use has been provided. Controlled imagery should only be used on NASA managed workstations and laptops. Users should verify mode of delivery before transferring. When displayed, images should be clearly marked with the correct CUI designation (CUI//SP-EXPT). Additional information on NASA's CUI program is in NPR 2810.7, Controlled Unclassified Information.

RQ_020 Sensitive images shall be identified with the appropriate restriction marker/banner/flag according to their sensitivity.

RQ _021 This restriction marker/banner/flag shall accompany the image and be visible when the image is viewed, shared, downloaded, or printed.

This could be as a banner on the image itself, or with the sensitivity as part of the permanent file name., such as "GSFC_20240218_PACE_12345_CUI_ITAR".jpg.

RQ_022 The imagery and/or the container in which EAR or ITAR photos are maintained shall be marked as CUI//SP-EXPT.

RQ_023 Projects shall ensure that configuration and library systems used to manage and access imagery have controls in place to restrict access according to sensitivity levels.

11.3 Proprietary Imagery

Photographers have the responsibility to ensure that proprietary imagery is appropriately labeled and stored. This includes imagery captured as well as imagery contained in contract deliverables.

Appendix A - Standard Requirements Table

Requirement Number	Requirement	Document Section
2822 – RQ 001	NASA personnel and contractors capturing imagery while conducting official government activities on behalf of NASA shall adhere to the requirements identified in this document. This requirement applies to every individual and/or entity and is not limited to those assigned as official photographers and videographers.	1.2.1
2822 – RQ 002	Tailoring for application to a specific program or project shall be formally documented as part of a program or project requirement and approved by the NIEG CCB.	1.3
2822 - RQ 003	Due to export control concerns, intellectual property concerns, and photo quality considerations, photos shall only be taken using NASA cameras. The use of personal cameras and/or non-approved camera devices is forbidden except in extraordinary cases, with documented authorization from project management (or higher).	6.3
2822 – RQ 004	In such circumstances, photos taken with a personal device shall comply with requirements in this directive as well as all ITAR, EAR, Classified and CUI restrictions; be transferred immediately to the project's database management system for cataloging and storage, and deleted from the personal device.	6.3
2822 – RQ 005	Images associated with official NASA work statements/orders are considered official records. They shall contain, at a minimum, a core set of metadata (reference section 8.4) and follow the NRRS 1441.1 guidance	7.2
2822 – RQ 006	Minimum image resolution and image formats shall comply with National Archives and Records Administration (NARA) regulations. (Reference NARA approved file sizes and formats at https://www.archives.gov/records-mgmt/initiatives/digital-photo-records.html	7.3
2822 – RQ 007	All NASA image records shall include, at a minimum, the core metadata set as outlined in Appendix D. Additional elements though not required, are highly recommended for more comprehensive cataloging.	8.4.1
2822 – RQ 008	Metadata shall be associated with all imagery to support cataloging, search, and retrieval. Consistency of metadata is encouraged among the projects.	8.4.1
2822 – RQ 009	When an image record is converted, digitized or transformed into a new image record, the original metadata, descriptors, and file names shall be retained in the new image record's metadata.	8.4.1
2822 – RQ 010	The Center location or affiliate site shall be where the image record was initially acquired, as indicated below…(refer to section 8.4.2.1 for details)	8.4.2.1
2822 – RQ 011	The date the image record was acquired shall be written as year, e.g., 2013, or as year/month/day, e.g., 20130529.	8.4.2.2
2822 – RQ 012	When the image record file format is changed or is migrated to a new storage medium, the date shall not be changed	8.4.2.2
2822 – RQ 013	The Item Number shall be a unique sequential number per calendar year for each image record.	8.4.2.3
2822 – RQ 014	A unique image record identifier shall be used for each image record. The intent of the unique identifier is to assign at a minimum, a center, year, and numeric value for each image.	8.4.3
Requirement Number	**Requirement**	**Document Section**

2822 – RQ 015	When an image record is transferred between organizations, the image unique identifier shall not be changed.	8.4.3
2822 – RQ 016	The unique identifier for permanent records shall at a minimum, follow the format: where "**AAAA**" is the NASA center of origin, *YYYY* is the four-digit year, and XXX.... is a sequential number of any length. Each new calendar year the sequential numbering starts over with the number "1" (i.e. GSFC_2024_001**...**) See section 8.4.2.1 for a list of Center identifiers	8.4.3
2822 – RQ 017	All personnel involved in the creation of NASA visual information shall work to meet the highest ethical standards followed by the Agency, the news industry, and other visual dissemination media.	9.1.1
2822 – RQ 018	The photographer or technician shall rename the permanent record according to the unique identifier requirements as outlined in section 8.4.3 and, apply the appropriate sensitivity label.	9.2
2822 – RQ 019	Approved and secure methods of storage and transfer shall only be used as referenced in NIST SP 800-53	11.2
2822 – RQ 020	Sensitive images shall be identified with the appropriate restriction marker/banner/flag according to their sensitivity	11.2
2822 – RQ 021	This restriction marker/banner/flag shall accompany the image and be visible when the image is viewed, shared, downloaded, or printed. This could be as a banner on the image itself, or with the sensitivity as part of the permanent file name., such as "GSFC_20240218_PACE_12345_CUI_ITAR".jpg.	11.2
2822 - RQ 022	The imagery and/or the container in which EAR or ITAR photos are maintained shall be marked as CUI//SP-EXPT.	11.2
2822 - RQ 023	Projects shall ensure that configuration and library systems used to manage and access imagery have controls in place to restrict access according to sensitivity levels.	11.2

Appendix B - Recommendations

Recommendation Number	Recommendation	Document Section
2822 – REC 001	Each NASA center should develop an imagery guidance or procedural requirements document based on the recommendations and requirements contained herein. (Reference examples in NASA's Still and Motion Imagery Handbook)	6.1
2822 – REC 002	Projects should generate photo/video documentation plans that align with this and their respective center's requirements (reference 3.1 above) and include specific photographic requirements pertinent to their mission. (Reference examples in NASA's Still and Motion Imagery Handbook)	6.2
2822 – REC 003	The procedures outlined in each program/project's photo plan should identify the acceptable camera/video devices, acceptable image resolution, and describe a process for equipment control and maintenance. Any still or motion imagery captured by anyone other than the official NASA photographer/videographer with the intent to use for official government business must adhere to these requirements.	6.3
2822 – REC 004	In an effort to streamline services and maintain consistency within a center or agency, it is highly recommended that projects requiring photographic and/or video services coordinate with their center/agency Contracting Officer and their center's NIEG Configuration Control Board (CCB) member to evaluate and ensure they are not violating existing contracts with similar support.	6.4
2822 – REC 005	Contractors should follow the guidance and metadata conventions described throughout section 8.4. Proprietary imagery should be accurately identified, and access controlled as per vendor requirements.	7.0
2822 – REC 006	The project/program manager should identify in the photo plan when photos should be taken and document these requirements in their work statements/work orders. This ensures that critical steps throughout the activity are visually documented within the window of opportunity.	7.2
2822 – REC 007	The program/project's photo documentation processes should be described in the photo plan and should enable traceability between a work statement/work order and the image records they support.	7.2
2822 – REC 008	The originator's closure/review of the work order should include verification that required stills and/or motion imagery have been taken, that the imagery resides in the program content management system and that any deviations to the work order/statement are noted.	7.2
2822 – REC 009	When conducting activity that will restrict visibility of an item or configuration, the work statement/work order should include verbiage such as "Subsequent steps should not be executed until close-out imagery has been taken."	7.3

Requirement Number	Requirement	Document Section
2822 – REC 010	Authorization to proceed without obtaining required imagery should be considered a "deviation" from the approved work statement/work order and requires action in accordance with the project's policy regarding deviations.	7.3
2822 – REC 011	For projects that include development of human-rated space flight hardware, photographic documentation procedures should incorporate additional requirements, such as those contained in the International Space Station Hardware Preflight Imagery Requirements Document, SSP 50502.	7.3
2822 – REC 012	At a minimum, the program/project/mission managers should include the following activities or items for still and/or motion imagery in photo documentation or project management plans: a. Waivers or deviations to actions that change the "as built" configuration b. Identification markings (decals, serial numbers, model numbers, part numbers) c. Views before and after external blankets, insulation, or other obscuring layers are removed or installed for flight close-outs.	7.3.1

Appendix C - Metadata Core Sets

NOTE: If an Agency provides additional metadata elements, NARA will accept that metadata as part of the transfer process in addition to NARA's minimum metadata requirements. Agencies should notify NARA of any metadata standards that are in use with permanent electronic records and provide relevant schemas, data dictionaries, controlled vocabularies, ontologies, and system indexes at the time of transfer.

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 NASA's 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 8 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*.

Appendix D - Extended Metadata

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 an image record 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 documents and the use of these 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.

Extended Metadata Elements contains the element name and a brief description. All NASA image records may have these 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.

Appendix E - Records Retention Schedule 8

Record Title	**Record Custodian**	**Retention**
Original images and supporting data	See the applicable organization file	a. Projects of historical significance (see NRRS 8/101 for description)

associated with the documentation of space flight and ground system hardware	plan, per GPR 1441.1	• Records essential for understanding the history of a program or project: *NRRS 8/101: Permanent. Cut off records at close of program/project or in 3-year blocks for long-term programs/projects. Transfer to National Archives 7 years after cutoff. • Records not required for documenting the history of the program/project but which have operational value: *NRRS 8/103: Temporary. Cut off records at close of program/project or in 5-year blocks. Destroy/delete between 0 and 30 years after cutoff. b. Programs/projects that do not meet the criteria stated in 8/101 *NRRS 8/107. Temporary. Destroy/delete between 0 and 30 years after program/project termination.

**NRRS 1441.1 – NASA Records Retention Schedules*

Appendix F - Reference Documentation

1. 36 CFR Part 1237, Audiovisual, Cartographic, and Related Records Management
2. 22 CFR 120-130, International Traffic In Arms Regulations (ITAR)
3. 15 CFR 730-774, Export Administration Regulations (EAR)
4. Columbia Accident Investigation Board (CAIB) Report
5. ISO 14721 ISS space Data and Information Transfer Systems – Open Archival Information System (OAIS) – Reference model, Second Edition
6. ISO 15489-1 Information and Documentation – Records management – Part 1: General
7. ISO 15836 Information and Documentation – The Dublin Core Metadata Element Set, Second Edition
8. ISO 16363 Space Data and Information Transfer Systems – Audit and certification of trustworthy digital repositories, First Edition
9. ISO/TR 15489-2 Information and documentation –Records management part 2: Guidelines
10. ISO/TR 15801 Document management – Information stored electronically – Recommendations for trustworthiness and reliability
11. LPR 7600.1, Closeout Photographs for Flight and Ground Hardware Procedural Requirements
12. National Archives and Records Administration (NARA) regulations (Bulletin 2015-04)
13. NASA Imagery Experts Program Charter (Human Exploration and Operations Directorate)
14. NAS10-02007, Appendix 22, Checkout Assembly and Payload Processing Services (CAPPS) for the International Space Station Working Group preflight imagery requirements
15. NPD 1383.1 Release and Management of audiovisual Products
16. ITS-HBK-2810.08-01, Contingency Planning
17. "A Renewed Commitment to Excellence" (Diaz team report), released January 30, 2004
18. SMPTE Standard 377-1 Material Exchange Format (MXF) File Format Specification