Federal Agencies
Digitization Guidelines Initiative

Creating and Archiving Born Digital Video

Part IV. Resource Guide

September 8, 2014

The FADGI Audio-Visual Working Group

http://www.digitizationguidelines.gov/audio-visual/

Creating and Archiving Born Digital Video IV: Resource Guide

By the Federal Agencies Digitization Guidelines Initiative Audio-Visual Working Group
http://www.digitizationguidelines.gov/audio-visual/

Version 1.0, September 8, 2014

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INTRODUCTION

WHAT IS THIS DOCUMENT?

This is one of four documents examining aspects of the current practice for creating and archiving born digital video at selected institutional members of the Federal Agencies Digitization Guidelines Initiative Audio-Visual Working Group. The three companion documents are:

- *Creating and Archiving Born Digital Video I:Introduction (Version 1.0, 9/8/14)*
- *Creating and Archiving Born Digital Video II: Eight Federal Case Histories (Version 1.0, 9/8/14)*
- *Creating and Archiving Born Digital Video II: High Level Recommended Practices (Version 1.0, 9/8/14)*[1]

This document includes links to useful resources for creating and archiving born digital video. Many of these resources are referenced in the *Case Histories* and *Recommended Practices* documents.

GENERAL RESOURCES

Archive2020 - Sustainable Archiving of Born-Digital Cultural Content
http://issuu.com/virtueelplatform/docs/archive2020_def_single_page
Report of a meeting held in Amsterdam in 2009 focusing on questions of the nature of born digital archives. Includes working definition of the term "born digital."

ARL SPEC Kit 329: Managing Born-Digital Special Collections and Archival Materials (August 2012)
http://publications.arl.org/Managing-Born-Digital-Special-Collections-and-Archival-Materials-SPEC-Kit-329
This SPEC Kit explores the tools, workflow, and policies special collections and archives staff use to process, manage, and provide access to born-digital materials they collect. It also looks at which staff process and manage born-digital materials and how they acquire the skills they need for these activities, and how libraries have responded to the challenges that managing born-digital materials present.

Born Digital Collections: AIMS An Inter-Institutional Model for Stewardship (2009 - 2011)
http://www.digitalcurationservices.org/aims/ and http://www.digitalcurationservices.org/aims/white-paper/
Report of partnership between the University of Virginia, Stanford University, Yale University, and the University of Hull (UK) to create a shared framework which focused on four main components:

- Collection Development
- Accessioning
- Arrangement and Description
- Discovery and Access

Born Digital: Guidance for Donors, Dealers, and Archival Repositories
by CLIR
http://www.clir.org/pubs/reports/pub159
This report offers recommendations to help ensure the physical and intellectual well-being of born-digital materials transferred from donors to archival repositories. The report surveys the primary issues and concerns related to born-digital acquisitions and is intended for a broad audience with varying levels of interest and expertise, including donors, dealers, and repository staff.

Defining "Born Digital" An Essay
by Ricky Erway, OCLC Research
https://www.oclc.org/content/dam/research/activities/hiddencollections/borndigital.pdf
The purpose of this document is to define "born digital" and the various types of born-digital materials.

[1] The URLs for the three documents are:
(II) http://www.digitizationguidelines.gov/guidelines/FADGI_BDV_p1_20140908.pdf
(III) http://www.digitizationguidelines.gov/guidelines/FADGI_BDV_p2_20140908.pdf
(IV) http://www.digitizationguidelines.gov/guidelines/FADGI_BDV_p3_20140908.pdf

Digital Audio and Video White Paper
by the Minnesota Historical Society
http://www.mnhs.org/preserve/records/legislativerecords/docs_pdfs/DigitalAudioVideo052009_001.pdf
This paper summarizes various components of digital audio and video files from legislative floor sessions and committee meetings and covers important issues to consider when working with such files.

Digital Preservation Reading List
by NEDCC
http://www.nedcc.org/assets/media/documents/DigiPres_Biblio_Digital_Directions_2014_update.pdf
Annotated bibliography with resources to help with the challenges associated with developing a digital preservation plan and repository, and successful strategies for overcoming those challenges.

JISC Digital Media InfoKit: High Level Digitisation for Audiovisual Resources
http://www.jiscdigitalmedia.ac.uk/infokit/audiovisual-digitisation
This infokit aims to provide an overview of the considerations involved with high-level digitization; technical advice relating to the digitisation and care of specific media formats; and advice on equipment.

NDSA Levels of Digital Preservation
http://www.digitalpreservation.gov/ndsa/activities/levels.html
While not specifically aimed at born digital video, the “Levels of Digital Preservation" are a tiered set of recommendations for how organizations should begin to build or enhance their digital preservation activities.

Preserving Write-Once DVDs: Producing Disk Images, Extracting Content, and Addressing Flaws and Errors
By George Blood Audio Video Film for the Library of Congress
http://www.digitizationguidelines.gov/audio-visual/documents/Preserve_DVDs_BloodReport_20140901.pdf
As part of a 500-disk reformatting project began in 2013, the Library asked GBAVF to document the issues they encountered and to report on the steps they took to remedy the problems

Presto Centre AV Insider
https://www.prestocentre.org/av-insider
Quarterly magazine for the international audiovisual digital preservation community

Walk This Way: Detailed Steps for Transferring Born-Digital Content from Media You Can Read In-house
by Julianna Barrera-Gomez and Ricky Erway, for OCLC Research
http://oclc.org/content/dam/research/publications/library/2013/2013-02.pdf
This paper will take the reader to the point where the digital content has been successfully transferred and preliminary processing of the files has begun.

DIGITAL STORAGE

Selected Presentations from Designing Storage Architectures for Digital Collections 2013 Meeting at the Library of Congress

Standards and Digital Archives
Henry Newman - Instrumental, Inc.
http://www.digitalpreservation.gov/meetings/documents/storage13/HenryNewman_Techoverview.pdf

LC Storage Environment
Carl Watts - Library of Congress,
http://www.digitalpreservation.gov/meetings/documents/storage13/CarlWatts_TechnologyOverview_TieredStorageDefined.pdf

Lessons Learned: Upgrading for Increased Throughput
Scott Rife, Library of Congress Packard Campus for Audio Visual Conservation
http://www.digitalpreservation.gov/meetings/documents/storage13/ScottRife_TechnologyOverviewLessonsLearned.pdf

Motion Picture Industry Perspective
Andy Maltz, Academy of Motion Picture Arts and Sciences
http://www.digitalpreservation.gov/meetings/documents/storage13/AndyMaltz_Community-LCDSA2013_AMPAS.pdf

TRANSCODING AND EDITING SOFTWARE APPLICATIONS AND OTHER TECHNICAL TOOLS

FFmpeg
www.ffmpeg.org
Open source command line tool for transcoding audio and video assets, with ability to record and stream.

ImgBurn
www.imgburn.com
Free application to read, write, verify ISO disk images from DVDs or a DVD nested file structure

Handbrake
handbrake.fr
A free program to make small mp4 derivatives from various codecs and/or streaming files for DVDs.

MPEG Streamclip
www.squared5.com
Play and edit or transcode many different audio and video formats, including the ability to batch transcode. MPEG Component is an additional download for a fee to be able to play MPEG2s.

INVENTORYING AND PROCESSING

Reports, Guidelines and Practices

What's Your Product? Assessing the suitability of a More Product, Less Process Methodology for Processing Audiovisual Collections by Joshua Ranger, AV Preserve
www.avpreserve.com/wp-content/uploads/2012/08/WhatsYourProduct.pdf
Guide to minimal level processing for AV collections with a recommended list of fields to capture

Software Applications and Other Technical Tools

AJA DataCalc
ww.aja.com/en/software
Free commercial tool to calculate digital storage needs before digitizing or receiving files.

AVCC Cataloging Toolkit
keepingcollections.org/avcc-cataloging-toolkit
Beta. Free set of forms and guidelines developed to enable efficient item-level cataloging of audiovisual collections. Developed by AVPS.

ExifTool
www.sno.phy.queensu.ca/~phil/exiftool
Free command line application useful for reading, writing and editing meta information in various file types.
AVPS basic tutorial series: www.avpreserve.com/exiftool-tutorial-series
ExifTool GUI (must have ExifTool first) u88.n24.queensu.ca/~bogdan

FFprobe
www.ffmpeg.org/ffprobe.html
Free and open source. Part of the FFmpeg family. FFprobe is a command line application to analyze and output multimedia stream information.

GSpot
http://www.headbands.com/gspot/
Free technical metadata reader

MediaInfo
sourceforge.net/projects/mediainfo
Free open source technical metadata viewer.

NARA File Analyzer
Free and open source
github.com/usnationalarchives/File-Analyzer
Georgetown University Libraries File Analyzer (further extension of NARA File Analyzer)
github.com/Georgetown-University-Libraries/File-Analyzer/wiki
General purpose desktop (and command line) tool designed to automate simple, file-based operations.

VLC
www.videolan.org/vlc/index.html
Free and open source cross-platform multimedia player and framework that plays most multimedia files as well as DVD, Audio CD, VCD, and various streaming protocols.

DIGITIZATION/CAPTURE, PRESERVATION AND QUALITY CONTROL

Reports, Guidelines and Practices

And Action: The Ins and Outs of DVD Video Preservation: Lynda Schmitz Fuhrig, Smithsonian Institution Archives
http://siarchives.si.edu/blog/and-action-ins-and-outs-dvd-video-preservation
Very helpful blog post about extracting and preserving data from authored DVDs.

Consortium of Academic and Research Libraries in Illinois (CARLI) Guidelines for the Creation of Digital Collections: Digitization Best Practices for Moving Images
http://www.carli.illinois.edu/sites/files/digital_collections/documentation/guidelines_for_video.pdf
This document sets forth guidelines for digitizing moving image materials for CARLI Digital Collections. It provides a set of recommendations for technical specifications that digital objects should adhere to, as well as a discussion of digital video concepts, file formats, web delivery, and digitization workflow.

Digital Video Preservation and Oral History, Oral History in the Digital Age: Kara Van Malssen
http://ohda.matrix.msu.edu/2012/06/digital-video-preservation-and-oral-history/
This paper provides a discussion of preservation issues, primarily for born-digital, file-based workflows, but also for video content digitized from analog sources. Regardless of the source of the content, the long-term preservation and management concerns remain the same for all types of digital video.

Digitizing Video for Long-term Preservation: An RFP Guide and Template
http://library.nyu.edu/preservation/VARRFP.pdf
Developed by New York University, this RFP guide includes a template to assist in drafting a Request for Proposals (RFP) for the transfer of analog video, specifically VHS, to digital carriers for preservation.

Guide to Developing a Request for Proposal for the Digitization of Video (and More)
www.avpreserve.com/wp-content/uploads/2013/10/AVPS_Digitization_RFP_Guide.pdf
A resource and template developed by AVPS to help craft a Request for Proposal in outsourcing audiovisual collections for preservation with vendors or creating internal standards.

Strategies for Sustainable Preservation of Born Digital Public Television
http://www.thirteen.org/ptvdigitalarchive/files/2009/10/PDPTV_SustainabilityStrategies.pdf
This report examines the requirements for long-term preservation of born digital video files. It analyzes the costs and potential income sources associated with maintaining a preservation repository, and argues that the operating costs can be self-sustaining.

Software Applications and Other Technical Tools

DV Analyzer
www.avpreserve.com/dvanalyzer
A technical quality control and reporting tool that examines DV streams in order to report errors in the tape-to-file transfer process to allow for integrity monitoring during reformatting of DV tapes and extract meaningful metadata from DV files. Developed by AVPS.

QC Tools
bavc.org/qctools
In beta testing, this tool is designed by Bay Area Video Coalition (BAVC) to assist in quality control for analog to digital video preservation. Designed to work in conjunction with the A/V Artifact Atlas, preservation.bavc.org/artifactatlas/index.php/Main_Page, built to assist archivists, collection managers, etc. reliably identify artifacts and errors in the reformatting, playback, and/or preservation of audiovisual material and build a common vocabulary among stewards, vendors, engineers, and others.

AUTHENTICITY, FIXITY AND INTEGRITY

Reports, Guidelines and Practices

Checking Your Digital Content: What is Fixity and When Should I be Checking It?
By National Digital Stewardship Alliance Standards and Infrastructure working groups
URL TO COME
An overview of fixity concepts and implementation options for the digit al heritage community.

Reconsidering Checksums
by Dave Rice
http://dericed.com/tag/fixity/
The article discusses two different approaches used in the application of checksums for audiovisual data: embedded checksums data used to audit transmission (MPEG CRCs, FLAC Fingerprints, and DV parity data) and external whole file checksums (more typical to digital preservation environments).The article explores why the effectiveness of a whole file checksum does not scale well for audiovisual data and makes proposals on how formats such as ffmpeg's framemd5 can enable more granular and efficient checksums for audiovisual data.

It's Not Just Integrity: Fixity Data in Digital Sound and Moving Image Files
by Kate Murray and Carl Fleischhauer, The Signal Blog, Library of Congress
http://blogs.loc.gov/digitalpreservation/2014/03/its-not-just-integrity-fixity-data-in-digital-sound-and-moving-image-files/
Blog post explores the role of fixity data in digital sound and moving image files, including MXF.

Write Blockers
Forensics Wiki
http://www.forensicswiki.org/wiki/Write_Blockers
Discusses the use of write blockers and lists options for hardware and software

Software Applications and Other Technical Tools

BagIt
sourceforge.net/projects/loc-xferutils
BagIt transfer Utilities are a collection of tools developed for the purpose of validation and transfer of bags. Transfer content using the BagIt tools to ensure data integrity. Developed by the Library of Congress and their partners in the National Digital Information Infrastructure and Preservation Program (NDIIPP).

DROID
http://droid.sourceforge.net/
DROID (Digital Record Object Identification) created by the National Archives UK is a free automatic file format identification tool.

FFmpeg
https://ffmpeg.org/
Free and open source toolset Includes capabilities to generate both framecrc and framemd5 checksums

FITS
http://projects.iq.harvard.edu/fits
The free and JAVA-based File Information Tool Set (FITS) identifies, validates and extracts technical metadata for a wide range of file formats.

Fixity
www.avpreserve.com/avpsresources/tools
A free application to allow for the documentation, monitoring, and regular integrity checks of stored files.

FOURCC values
http://www.fourcc.org/codecs.php
https://developer.apple.com/library/mac/technotes/tn2273/_index.html
https://developer.apple.com/library/mac/technotes/tn2162/_index.html
http://msdn.microsoft.com/en-us/library/windows/desktop/dd206750%28v=vs.85%29.aspx
A FOURCC code is a sequence of four bytes, usually four concatenated ASCII characters, used to uniquely identify data formats. For example, the FOURCC code for YUY2 video is 'YUY2'. The FOURCC codes can be used efficiently in program code as integers as well as providing human reading cues in binary data streams when inspected.

JHOVE
http://sourceforge.net/projects/jhove/
JHOVE provides functions to perform format-specific identification, validation, and characterization of digital objects.

JHOVE2
https://bitbucket.org/jhove2/main/wiki/Home
JHOVE2 is open source software for format-aware characterization of digital objects.

MD5
www.fourmilab.ch/md5
Command line utility usable on either Unix or MS-DOS/Windows, which generates and verifies message digests (digital signatures) using the MD5 algorithm.

md5deep
md5deep.sourceforge.net
A command line program to compute md5 hash values on a Windows machine.

Rsync
rsync.samba.org
A command line utility used for backups, but also very helpful in copying from one storage system to another (e.g., from hard drive to watch folder).

FILE NAMING

Reports, Guidelines and Practices

Best Practices for File Naming
Stanford University Libraries
http://library.stanford.edu/research/data-management-services/data-best-practices/best-practices-file-naming
Includes tips on file naming protocols and bulk renaming tools

Standard Naming Conventions for Electronic Records
University of Edinburgh Records Management Section
http://www.recordsmanagement.ed.ac.uk/InfoStaff/RMstaff/RMprojects/PP/FileNameRules/FileNameRules.htm
Includes link to file naming rules

Software Applications and Other Technical Tools

Bulk Rename Utility
http://www.bulkrenameutility.co.uk/Main_Intro.php
Free file renaming software for Windows

METADATA

Reports, Guidelines and Practices

Recommended Metadata Guidelines for Describing Born-Digital Master Programs for Preservation and Deposit with The Library of Congress and Other Digital Repositories.
http://www.thirteen.org/ptvdigitalarchive/files/2009/10/metadata-guidelines.pdf
Overview of descriptive and preservation metadata necessary for the long-term access of digital television program assets. From Preserving Public Television Project (2007)

Software Applications and Other Technical Tools

AVI-MetaEdit
github.com/usnationalarchives/AVI-MetaEdit
Software developed at NARA by AVPreserve to embed, edit, import, and export metadata in RIFF-based AudioVisual Interleave format (AVI) video files.

MDQC
MDQC reads the embedded metadata of a file or directory and compares it against a set of rules defined by the user, verifying that the technical and administrative specs of the files are correct. Developed by AVPS.
http://www.avpreserve.com/avpsresources/tools/#sthash.xt3arPfv.dpuf

Metadata Standards and Schemas

PBCore
http://www.pbcore.org/
PBCore is the metadata standard for audiovisual media developed by the public broadcasting community. In 2014 as part of the American Archive initiative, WGBH in collaboration with the Library of Congress has been charged with further developing PBCore (Public Broadcasting Metadata Dictionary).

reVTMD: NARA AudioVisual Metadata Extension Schema
http://www.archives.gov/preservation/products/reVTMD.xsd
A reVTMD expression contains technical and process metadata that describes a digital video object. reVTMD is supported by the version of MediaInfo available on NARA's Github site: https://github.com/usnationalarchives

videoMD
http://www.loc.gov/standards/amdvmd/audiovideoMDschemas.html
videoMD is an XML Schema that details technical metadata for video-based digital objects. It often serves as extension schemas within the Metadata Encoding and Transmission Standard (METS) administrative metadata section or in PREMIS version 2.0 or later in <objectCharacteristicsExtension>. It is also suitable for use as standalone metadata documents or may be considered for incorporation into other structures, e.g., as embedded metadata in Material eXchange Format (MXF) files.

FILE FORMAT SELECTIONS AND OTHER TECHNICAL INFORMATION

Apple Chroma Subsampling
http://documentation.apple.com/en/color/usermanual/index.html#chapter=1%26section=3%26tasks=true
Provides a useful overview of chroma subsampling ration including overviews for 4:4:4, 4:2:2 and 4:1:1

BAVC Frequently Asked Questions about Video Preservation
http://www.bavc.org/pres_FAQs
Helpful high level general information including classes of digital objects (master, production and access files)

California Preservation Program Frequently Asked Questions about Video Preservation
http://calpreservation.org/projects/audiovisual-preservation/
Website with details about the cooperative project to provide digitization and access services for historic California audiovisual recordings. Includes links for format specifications and best practices

Cascaded Audio Codec
by David Marston and Andrew Mason, BBC R&D
https://tech.ebu.ch/docs/techreview/trev_304-cascading.pdf
This article, based on a presentation given at IBC-2005, describes typical cascades of codecs found in radio broadcast chains, and aims to identify the most critical combinations.

CDL Digital File Format Recommendations: Master Production Files (CDL DFFR)
Maintained by the California Digital Library (2011)
www.cdlib.org/gateways/docs/cdl_dffr.pdf
Provides specifications for digital objects prepared by institutions for submission to CDL for preservation and access, through the CDL's Merritt Digital Repository and the Online Archive of California (OAC) and Calisphere services.

Choosing a Digital Video File Type
JISC Digital Media
http://www.jiscdigitalmedia.ac.uk/guide/choosing-a-digital-video-file-type
Basic overview of "wrapper" and "codec" definitions as well other components

File Formats Blog
by Gary McGath
http://fileformats.wordpress.com/
Blog covers formats beyond video but recent relevant discussions include posts on JHOVE and FITS.

Primer on Codecs for Moving Image and Sound Archives: 10 Recommendations for Codec Selection and Management
by Chris Lacinak, AV Preserve
http://www.avpreserve.com/wp-content/uploads/2010/04/AVPS_Codec_Primer.pdf
The purpose of this paper is to clarify what a codec is, how it is used and what that means to archives

Refining Conversion Contract Specifications: Determining Suitable Digital Video Formats for Medium-term Storage
George Blood Audio and Video for the Library of Congress Office of Strategic Initiatives (OSI)
http://www.digitizationguidelines.gov/audio-visual/documents/IntrmMastVidFormatRecs_20111001.pdf
The recommendations in this report offer answers to the following questions:

- What formats will remain viable during the three to ten year period defined?
- What formats permit the retention of all of the "essential features" of the source items, i.e., formats that do not represent a loss of picture and sound quality and also retain metadata, closed captioning, or other functional features of the original?

Transfer Guidance
National Archives and Records Administration
http://www.archives.gov/records-mgmt/policy/transfer-guidance.html
Specifies which file formats are acceptable when transferring permanent electronic records to NARA

Products and Services, Digitization Services,
National Archives and Records Administration
http://www.archives.gov/preservation/products/
Technical details for physical and digital reformatting products created within NARA preservation labs, including video: http://www.archives.gov/preservation/products/reformatting/video.html

Selecting Digital File Formats for Long-Term Preservation.
General Study 11 Final Report, InterPARES2 (2007)
http://www.interpares.org/ip2/ip2_case_studies.cfm?study=35
The paper offers a mainly qualitative review of documentation on the Web sites of twenty repositories and four multi-institutional collaborative groups which have well established ingest policies and/or procedures or guidelines for agencies transferring records.

Survey of Digital Formatting Practices in Public Television Program Production
Dave MacCarn, Chief Technologist, WGBH Television
http://www.thirteen.org/ptvdigitalarchive/files/2009/10/PDPTV_SustainabilityStrategies.pdf
This report examines the requirements for long-term preservation of born digital video files. It analyzes the costs and potential income sources associated with maintaining a preservation repository, and argues that the operating costs can be self-sustaining.

Sustainability of Digital Formats Website, Quality and Functionality Factors for Moving Images
Library of Congress
http://www.digitalpreservation.gov/formats/content/video_quality.shtml
Factors appropriate for the evaluation of digital formats for moving images

What Standard Should I Follow?
PrestoCentre
https://www.prestocentre.org/answers/frequently-asked-questions/what-standards-should-i-follow
Q&A format about standards and best practice for audiovisual content

Video Formats Explained
http://www.videomaker.com/article/15362-video-formats-explained
General overview of wrappers and codecs

STANDARDS DOCUMENTATION

This section includes relevant container and encoding standards information for the formats referenced in the case histories as well as selected general standards important to creating and archiving digital video. Links to specific standards documents are included only when directly accessible from the publishing entity for no-fee.

Compiled Standards Lists

Standards Register
PrestoCentre
https://www.prestocentre.org/standards
The Standards Register incorporates information on selected standards for content and metadata used across all communities involved in audiovisual digital preservation.

General Standards Documents

ITU-R BT.601-7 (03/2011) Studio Encoding Parameters of Digital Television for Standard 4:3 and Wide-screen 16:9 Aspect Ratios
This Recommendation for encoding interlaced standard definition analog video signals in digital video form.
https://www.itu.int/dms_pubrec/itu-r/rec/bt/R-REC-BT.601-7-201103-I!!PDF-E.pdf (no fee)

ITU-R BT.709-5 (04/2002) Parameter Values for the HDTV Standards for Production and International Programme Exchange
This Recommendation defines the image format parameters and values for HDTV.
http://www.itu.int/dms_pubrec/itu-r/rec/bt/R-REC-BT.709-5-200204-I!!PDF-E.pdf (no fee)

DV25 Standards

IEC 61834-1. Recording - Helical-scan digital video cassette recording system using 6,35 mm magnetic tape for consumer use (525-60, 625-50, 1125-60 and 1250-50 systems) - Part 1: General specifications
Specifies the content, format and recording method of the data blocks forming the helical records on the tape. Describes the common specifications for cassettes, modulation method, magnetization and basic system data, for helical-scan digital video cassette recording system using 6,35 mm (1/4 inch) magnetic tape. Defines the electrical and mechanical characteristics of equipment which will provide for the interchangeability of recorded cassettes.
http://webstore.iec.ch/Webstore/webstore.nsf/Homepage?ReadForm (fee)

IEC 61834-2: Recording – Helical-Scan Digital Video Cassette Recording System Using 6,35 Mm Magnetic Tape For Consumer Use (525-60, 625-50, 1125-60 and 1250-50 systems) – Part 2: SD format for 525-60 and 625-50 systems
This part of IEC 61834 specifies the content, format and recording method of the data blocks forming the helical records on the tape containing audio, video, and system data. It describes the specifications for the 525-60 and 625-50 systems.
http://webstore.iec.ch/Webstore/webstore.nsf/Homepage?ReadForm (fee)

SMPTE 314M. Television - Data Structure for DV-Based Audio, Data and Compressed Video - 25 and 50 Mb/s
This standard defines the DV-based data structure for the interface of digital audio, subcode data, and compressed video for DV25, DV50, DVCAM and DVCPro
http://standards.smpte.org/ (fee)

ST 370:2006. For Television — Data Structure for DV-Based Audio, Data and Compressed Video at 100 Mb/s 1080/60i, 1080/50i, 720/60p, 720/50p
This standard defines the data structure for the interface of DV-based digital audio, subcode data, and compressed video for DVCProHD.
http://standards.smpte.org/ (fee)

JPEG2000 Standards

ISO/IEC 15444-1:2004. Information technology -- JPEG 2000 image coding system: Core coding system
ISO/IEC 15444-1:2004 | ITU-T Rec. T.800 defines a set of lossless (bit-preserving) and lossy compression methods for coding bi-level, continuous-tone grey-scale, palletized colour, or continuous-tone colour digital still images.
http://www.iso.org/iso/home/store/catalogue_ics.htm (fee)

MPEG-2 Standards

ISO/IEC 13818, prepared by SC29/WG11, define the MPEG-2 family of encodings and is published in three parts.

MPEG-2 ISO/IEC 13818-1: Information technology -- Generic coding of moving pictures and associated audio information -- Part 1: Systems
ISO/IEC 13818-1:2013 specifies the system layer of the coding. It was developed principally to support the combination of the video and audio coding methods defined in ISO/IEC 13818-2 and ISO/IEC 13818-3. The system layer supports six basic functions: 1. the synchronization of multiple compressed streams on decoding; 2. the interleaving of multiple compressed streams into a single stream; 3. the initialization of buffering for decoding start up; 4. continuous buffer management; 5. time identification; 6. multiplexing and signaling of various components in a system stream
http://www.iso.org/iso/home/store/catalogue_ics.htm (fee)

MPEG-2 ISO/IEC 13818-2: Information technology - Generic coding of moving pictures and associated audio information: Video
ISO/IEC 13818-2:2013 specifies a coded representation of video data and the decoding process required to reconstruct pictures. It provides a generic video coding scheme which serves a wide range of applications, bit rates, picture resolutions and qualities. Its basic coding algorithm is a hybrid of motion compensated prediction and discrete cosine transform (DCT). Pictures to be coded can be either interlaced or progressive. Necessary algorithmic elements are integrated into a single syntax, and a limited number of subsets are defined in terms of Profile (functionalities) and Level (parameters) to facilitate practical use of this generic video coding International Standard.
http://www.iso.org/iso/home/store/catalogue_ics.htm (fee)

MPEG-2 ISO/IEC 13818-3: Information technology -- Generic coding of moving pictures and associated audio information -- Part 3: Audio
ISO/IEC 13818 specifies the extension of ISO/IEC 11172-3 to lower sampling frequencies, the coded representation of multichannel and multilingual high quality audio for broadcasting, transmission and storage media, and the method for decoding of multichannel and multilingual high quality audio signals. The input of the encoder and the output of the decoder are compatible with existing PCM standards.
http://www.iso.org/iso/home/store/catalogue_ics.htm (fee)

MXF Standards

SMPTE ST 377-1:2011. Television — Material Exchange Format (MXF) — File Format Specification
This standard defines the data structure of the Material Exchange Format (MXF) mainly thought for the interchange of audio-visual material but also used for preservation. The document defines all the components of the MXF file specification including all those in the File Header, File Body and File Footer. The document does not define either the Essence Container or the Descriptive Metadata. Instead, it defines the structure and the basics elements that build an MXF file.
http://standards.smpte.org/ (fee)

SMPTE 378M-2004. Television — Material Exchange Format (MXF) — Operational Pattern 1a (Single Item, Single Package)
This standard defines operational pattern 1a for the exchange of a MXF file with a single item of a playable essence container comprising either a single essence element or interleaved essence elements (e.g. video plus its audio). It defines the operating restrictions, structural metadata objects and individual attributes that shall be applied to the MXF file format specification to achieve interoperability when exchanging an MXF file as a single, continuously playable item of audio-visual material. Operational pattern 1a is intended to meet the requirements of acquisition, storage and interchange applications that are satisfied by a single item of content packaged in a single essence container.
http://standards.smpte.org/ (fee)

ProRes Standards

ProRes is a proprietary format developed by Apple for which there is no formal standard published through an international standards organization.

Apple ProRes White Paper June 2014
The Apple ProRes family of video codecs includes Apple ProRes 4444 XQ, Apple ProRes 4444, Apple ProRes 422 HQ, Apple ProRes 422, Apple ProRes 422 LT and Apple ProRes 422 Proxie. This white paper provides in-depth information about all six members of the Apple ProRes family, including technical specifications and performance metrics.
http://www.apple.com/final-cut-pro/docs/Apple_ProRes_White_Paper.pdf (no fee)

Apple ProRes Format Specifications
Documentation from Apple describing frame sizes, frame rates, bit depths, and even color sample ratios.
https://documentation.apple.com/en/finalcutpro/professionalformatsandworkflows/index.html#chapter=10%26section=4 (no fee)

QuickTime Standards

QuickTime File Format Specification (current version)
Documentation from Apple about file format that wraps video, audio, and other bitstreams.
https://developer.apple.com/library/mac/documentation/QuickTime/QTFF/QTFFPreface/qtffPreface.html#//apple_ref/doc/uid/TP40000939-CH202-TPXREF101 (no fee)

QuickTime File Format Specification (classic version)
This is the document on which the original MP4 File Format Specification was based.
https://developer.apple.com/standards/qtff-2001.pdf (no fee)

DIGITAL VIDEO CREATION / "SHOOTING THE VIDEO" RESOURCES

Activists Guide to Archiving Video
by Witness (2013)
http://archiveguide.witness.org/
Helpful guide for field videographers to capture archival video. includes sections on creation, transfer, acquisition, organization, storage, cataloging, preservation and access.

Apple Support Communities Final Cut X
https://discussions.apple.com/community/professional_applications/final_cut_pro_x
General resource for Final Cut Pro users.

Billions of Bits, Just Thousands of Ways to Record 'Em
By Dave MacCarn, Chief Technologist, WGBH Television
https://secure.connect.pbs.org/PbsDocuments/PBS/QualityGroup/3%20Recording%20Options%20Dave%20MacCarn%20Final.pdf
Reprinted from *Current*, the newspaper about public TV and radio, June 7, 2010
Excellent summary of HD formats for initial capture

Choosing a format/codec for creating digital audio or video (Guideline 22)
New South Wales State Records (Australia):
http://www.records.nsw.gov.au/recordkeeping/government-recordkeeping-manual/guidance/guidelines/guideline-22/digital-audio-and-video-file-formats-form/choosing-a-format-codec-for-creating-digital-audio-or-video-guideline-22

Creative Cow: Gary Adcock's blog
http://blogs.creativecow.net/gary-adcock
Blog which includes some references to video production and preservation

Creative Cow Final Cut Pro Techniques Forum
http://forums.creativecow.net/fcpxtechnique
General resource for Final Cut Pro users.

dmia: Digital Moving Image Archives: A Guide for Independent Filmmakers
http://dmia.drupalgardens.com/
The Digital Moving Image Archives (DMIA) guide is designed for independent filmmakers to provide basic information about preserving digital data and to encourage collaboration with moving image archives.

Final Cut Pro Discussions
Ken Stone
http://www.kenstone.net/discussions/list.php?3
General resource for Final Cut Pro users.

Final Cut Pro News
http://www.fcp.co/?view=featured
General resource for Final Cut Pro users.

JISC Digital Media InfoKit: Video Production
http://www.jiscdigitalmedia.ac.uk/guide/basic-guide-to-shooting-video/
This resource is intended as a comprehensive guide to the production of videos. It is aimed at both researchers and teachers and the various uses to which they might wish to put video. It looks at equipment, the production process and delivery, and attempts to highlight common problems and pitfalls that a video maker may encounter.

EQUIPMENT / CAPTURE DEVICE RESOURCES

How'd They Shoot That? Here's the Cameras Used By the 2014 Sundance Filmmakers
http://www.indiewire.com/article/how-they-shot-that-heres-what-this-years-sundance-filmmakers-shot-on
List of cameras and some lens from directors and cinematographers with films in competition at Sundance 2014.

Oral History in the Digital Age: Video Equipment
http://ohda.matrix.msu.edu/2012/06/video-equipment/
The recommendations in this article are basic and primarily designed for individuals and small cultural heritage institutions collecting materials.

JISC Digital Media: Which Digital Camera Do You Recommend?
http://www.jiscdigitalmedia.ac.uk/guide/which-digital-camera-do-you-recommend
Pointers to help you decide if a particular camera will suit your needs.