FADGI's Significant Properties for Digital Video:
A Work in Progress

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NTTW4 | Budapest, Hungary | December 5, 2019

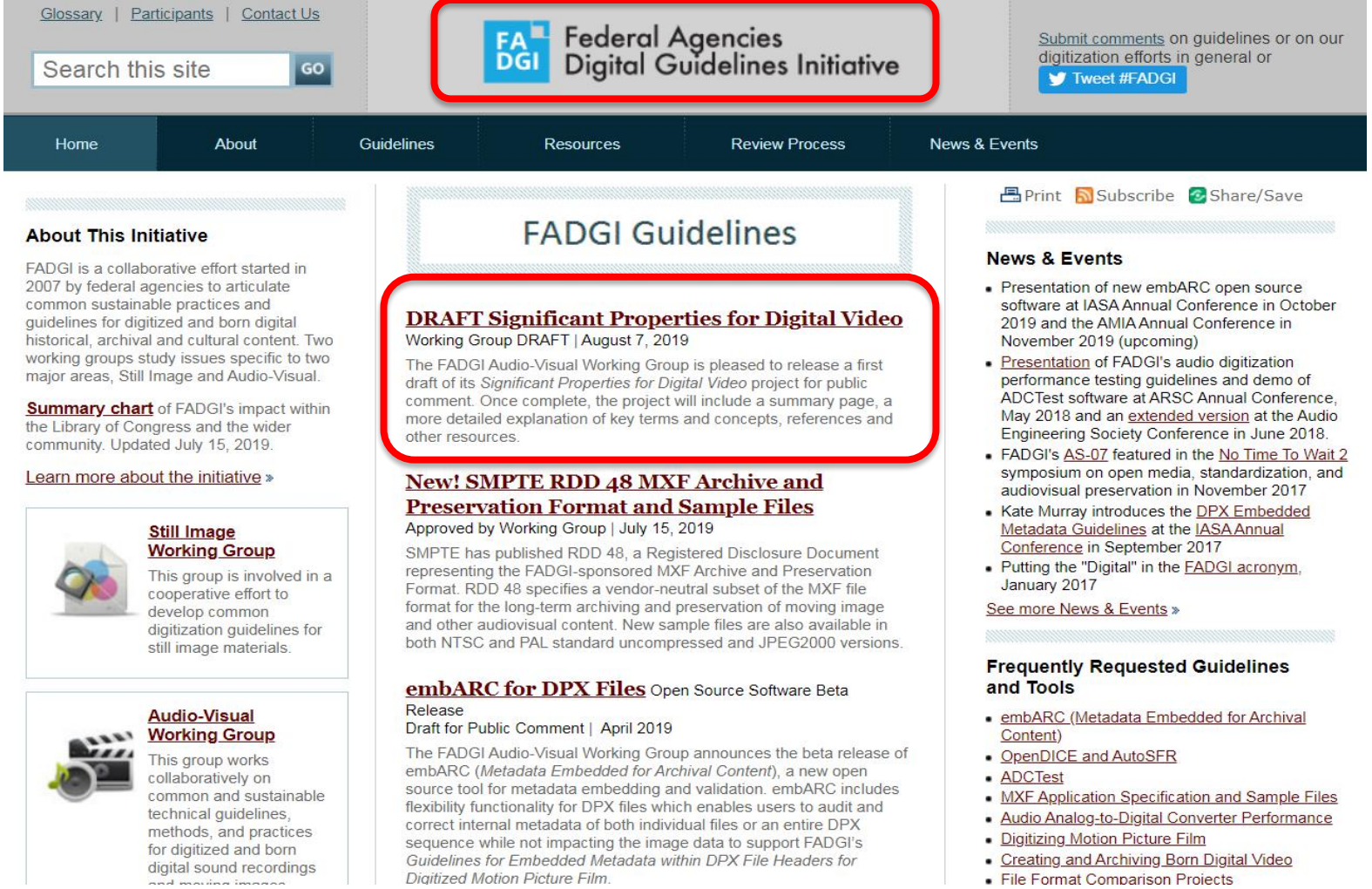
Project links

Easiest way:

http://www.digitizationguidelines.gov/guidelines/sigpropvideo.html

FSPDV Context direct link: http://tiny.cc/8ud9gz

FSPDV Spreadsheet direct link: http://tiny.cc/1vd9gz



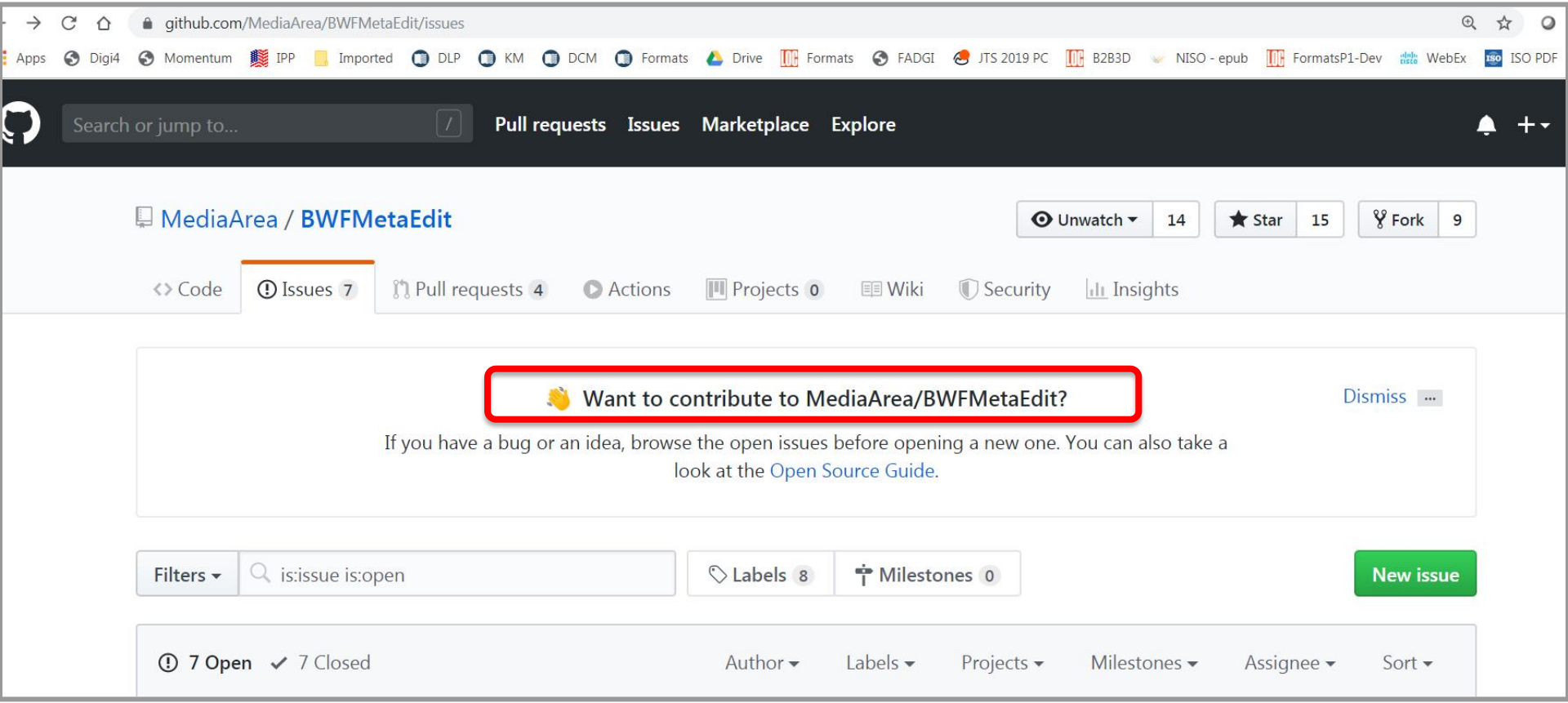
http://www.digitizationguidelines.gov/

20 Participating Agencies

- Military History Institute, Army Heritage and Education Center
- Defense Visual Information Management Operations Center (DIMOC)
- The Department of Justice
- Government Accountability Office
- Government Publishing Office
- The Institute of Museum and Library Services
- Johnson Space Center (NASA)
- Library of Congress
- National Aeronautics and Space Administration
- National Agricultural Library
- The National Archives and Records Administration
- National Gallery of Art
- The National Institute of Standards and Technologies
- The National Library of Medicine
- The National Park Service
- The National Technical Information Service
- The National Transportation Library
- Smithsonian Institution
- The U.S. Geological Survey
- The Voice of America

Often participating, not "official": NOAA, National Museum of Health and Medicine (U.S. Army), U.S. Supreme Court

But wait, there's more!



https://github.com/MediaArea/BWFMetaEdit/issues

Like puffy sleeves, significant properties are back in fashion

Inspired by 2018/2019 “Significant Significant Properties” work:

Significant significant properties:

“Those properties of information types that most preservation practitioners consider significant in most contexts”

(**Remco van Veenendaal, preservation officer at the National Archives of the Netherlands)**

Differs a bit from 2008 JISC report:

> This is where the core issue of this study arises. If the original object necessarily has to be changed in the course of processes designed to ensure its preservation over the longer term, which are the characteristics and features of the original that have to be preserved through these changes? That is, what are the *Significant Properties* of the object?

“Significant Significant Properties”

Video	Appearance	Aspect Ratio	[1],[5],[19]	3
Video	Appearance	Image Width	[1],[5],[18],[19]	4
Video	Appearance	Image Height	[1],[5],[18],[19]	4
Video	Appearance	Video length (e.g. 90 minutes,20 seconds)	[18]	1
Video	Content	Image Streams (number of distinct video channels)	[19]	1
Video	Content	Audio bit rate (kbps)	[18]	1
Video	Content	Audio frequency (kHz)	[18]	1
Video	Content	Audio number of channels	[18],[19]	2
Video	Content	Bit rate (kbps)	[18]	1
Video	Content	Bit depth (bits per sample)	[5],[19]	2
Video	Content	Frame rate (frames per second)	[5],[18],[19]	3
Video	Content	Colour model (the colour model used when recording the pixel value)	[19]	1
Video	Content	Colour space (specific organization of colours)	[5],[19]	2
Video	Content	Compression ratio	[5]	1
Video	Content	Codec (description of the coded used)	[5]	1
Video	Content	Scan type of source (interlaced or progressive)	[5],[19]	2
Video	Content	Length (number of frames in the recording)	[19]	1
Video	Context	Associated metadata	[18],[19]	2
Video	Context	File size	[18]	1

https://openpreservation.org/blog/2018/10/03/initial-list-of-significant-significant-properties-available/

FADGI project scope

- What are the significant technical properties in the majority of the digital video we might come across in the GLAM section?
- In what ways can those properties be changed?
- What is the impact of change on these properties?

(also completely selfish tie-in to FADGI's 2014 Creating and Archiving Born Digital Video project with high level recommendations: http://www.digitizationguidelines.gov/guidelines/video_bornDigital.html)

FSPDV Data Points

- Class of Significant Property (from JISC report)
- Property Name
- *Definition - in depth technical*
- *Definition - summary / lay person*
- Notes
- *References for definition*
- *Typical values (not exhaustive list)*

**Italics: information we haven't come across in other SP projects*

FSPDV (con’t)

- *Impact of change on this property*
- Relevant standards documents
- *Map to FADGI BDV High Level Recommended Practices*
- *How is this data represented through metadata in commonly used open source tools?*
  - mediainfo
  - ffprobe
  - exiftool

What FADGI thinks is, arguably, “significant”

Duration

Number of Moving Image/Video Channels or Tracks

Number of Audio Channels or Audio Tracks

Associated metadata

Display Aspect Ratio (DAR)

Image Size

Audio bit depth

Audio sampling rate

Key - Yellow highlight is not typically found on other projects; Orange highlight is augmented

FADGI properties (con’t)

Video bit depth

Video bit rate

Video bit rate mode (constant/variable)

Frame rate (frames per second)

Color gamut

Color channels

Color model

Color space (specific organization of colours) [ex YUV etc]

FADGI properties (con't)

Chroma sampling

File format (wrapper/container)

File bitstream encoding

Scan type (interlaced or progressive)

Timecode

File size

Captions/Subtitles

Field order

A few more maybes:

Frame rate mode (constant/variable)

Compression ratio

Class of Significant Property (from JISC report)	Property Name	Definition - in depth technical	Definition - summary / lay person
Rendering/Appearance	Image Size	The size of image measured in pixels for the horizontal dimension (width) and lines for the vertical dimension (height). The horizontal dimension is listed first and the two values are separated by an "x".	Often referred to as resolution, the image size is the basic measurement of how much information is on the screen. It is usually described as the number of pixels in the horizontal axis by the number of horizontal lines. The higher the numbers, the better the system's resolution.

Notes	Reference for definition - see Resources + Ref worksheet	Typical values (not exhaustive list)	Impact of change on this property
While the display and rendering of the video will depend on other factors as well, this value represents information that cannot be recouped once lost.	Adapted from Tektronix Glossary of Video Terms and Acronyms	NTSC VHS – 240 x 485; NTSC broadcast – 330 x 485; NTSC laserdisc – 425 x 485; ITU-R BT.601 (525/60) – 720 x 485; Computer screen – 1280 x 1024	potentially loss of information if reduced. If scaled up dramatically for display, may introduce visual artifacts and muddyness.

http://tiny.cc/1vd9gz

Relevant Standards	Map to FADGI BDV High Level Recommended Practices	How is this data represented through metadata in commonly used open source tools?		
		mediainfo	ffprobe (need to run command with the	exiftool (need to run command with -X, which gives better structured XML metadata)
BT.601 (SD) BT.709 (HD) BT.2020 (UHDTV), 3840x2160 4K UHD (defined by SMPTE ST 2036-1), 4096x2160 DCI 4K,	RP 1.5 Select larger picture sizes over smaller picture sizes	Width, Height	Width, Height (also one of the values listed in the generic "video" element)	ImageWidth, ImageHeight

Chroma sampling

Property Name	Definition - in depth technical	Definition - summary / lay person
Chroma sampling	Chroma sampling is the number of samples per sampling point taken when converting an analog signal to digital. It is represented by each color channel separated by a colon: for example 4:4:4. In the case of component color difference signals (which are a method or representing RGB color primaries but with less data) 4:2:2 represents YCbCr. The term "YUV" has also been used interchangeably to represent YCbCr but is a misnomer: YUV is actually the definition of analog PAL and SECAM component color difference signals (U stands for "unvarying" and V for "varying"). The proper term is YCbCr.	Chroma sampling is the number of samples per sampling point taken when converting an analog signal to digital. It is represented by each color channel separated by a colon: for example 4:4:4.

Video Tracks or Channels

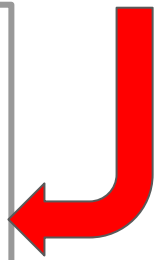
Property Name	Definition - in depth technical	Definition - summary / lay person	Notes
Number of Moving Image/Video Channels or Tracks	Number of video channels or streams present in a single file. Every stream is indexed in a wrapper.	Number of video channels or streams present in a single file.	Sometimes the terms "tracks", "channels" or "streams" are used interchangibly but they have distinct meanings. See the DRAFT - in depth worksheet for more information.

Sometimes the terms "tracks", "channels" or "streams" are used interchangeably but they have distinct meanings.

A track is "a distinct element of audiovisual information, such as the picture, a sound track for a specific language, or the like. DVD-Video allows one track of video (with multiple angles), up to 8 tracks of audio, and up to 32 tracks of subpicture."

A stream is "a collection of digital data of one type; such as a video stream, an audio stream or a subtitle stream. Each stream may also have channels within it."

A channel is "an independent signal path. Stereo recorders have two such channels. Quadraphonic ones have four."



Sometimes a summary is enough ...

Property Name	Definition - in depth technical	Definition - summary / lay person
Duration	The length of time (in hours, minutes, seconds and frames) a video lasts when played/viewed. Follows the ISO 8601 format of hh:mm:ss, which represents hours, minutes, and seconds. Two common types of duration which may exist in same file: 1) file duration which include headers with color bars, slates which run before program content etc.; and 2) program content only from the first frame to final frame of the fade out/ring out.	The runtime of the video which can be just the program content or include elements beyond the program content such as color bars, titles etc. Duration is usually represented in the standard ISO 8601 format of hh:mm:ss, which represents hours, minutes, and seconds.

Duration = runtime of the video. Simple, right?

Sometimes engineers are in the room & then this happens ...

Sig Properties for Video (from JISC report): Content: Number of images, audio streams, length Context: title, creator, date of creation, provenance Rendering/Appearance: frame width and height,	Criteria	More Information
Content	Duration	The length of time (in hours, minutes, seconds and frames) a video lasts when played/viewed. Follows the ISO 8601 format of hh:mm:ss, which represents hours, minutes, and seconds. Two common types of duration which may exist in same file: 1) file duration which include headers with color bars, slates which run before program content etc.; and 2) program content only from the first frame to final frame of the fade out/ring out. In files that contain time code (most widely used being SMPTE 12M timecode), the people who created the original tape or file usually used time code to indicate when the program actually starts (first active video frame) vs. the preamble video that may contain bars, black and slates. Typically a program will actually start at SMPTE timecode value 00:00:00:00. In some cases it may start as 01:00:00:00. In such cases the video before the actual start of the program will have timecodes before the two above values: typically starting at 23:59:30:00 for programs starting at 00:00:00:00; and 00:59:30:00 for programs starting at 01:00:00:00. In many cases the first two numbers of start timecode value were used to indicate the tape or hour or episode number of a given production. For example, if you had 4 videotapes carrying the complete film "Gone With the Wind", the first tape's first frame of active video would start at 01:00:00:00, the second tape at 02:00:00:00, the third tape at 03:00:00:00 and so on. For files that have preserved the original timecode that was on the tape, these may match this convention. For video produced in countried that used to transmit NTSC in the analog era, their current video production standards use the fractional frame rates used in the NTSC analog era: 23.98 fps for 24 frame film material, 29.97 and 59.94 fps for video. In the cases of video using these fractional frame rates, the SMPTE timecodes usually used are of the "drop frame" (DF) variety. Frames numbers (not actual frames of video) were omitted/skipped at defined points in the runtime of a video to keep the runtime of the video in sync with the actual runtime of the program. Since timecode is, essentially, a frame counter that shows you the hours, minutes, seconds, and frames, it's will drift from the actual runtime by 4.2 seconds per hour if frame numbers were NOT dropped during length of a program. It is a method for keeping the frame count that is time code from not also accurately representing the run time of a program. In the former PAL & SECAM countries which are based on 25 fps frame rates, timecode is non-drop frame.

We are still very drafty (best intentions and all that...) - lots of “to come”

Once complete, the project will include a summary page (hopefully formatted for printing out on one sheet - like a poster), a more detailed explanation of key terms and concepts, references and other resources.

Comments are ALWAYS welcome!

FADGI Shout Outs to

AJ Lawrence (NMAAHC)
Andy Marchesseault (VOA)
Blake McDowell (NMAAHC)
Charles Hosale (AFC/LC)
Courtney Egan (NARA)
Crystal Sanchez (SI OCIO)
Dan Finn (SAAM)
Hannah Vahle, (NMHM)
Isabel Meyer (SI OCIO)
James Snyder (NAVCC/LC)
Jessie Sims (NARA)
Julia Kim, (AFC/LC)
Kristen Cox (SI OCIO)
Laura Davis (NAVCC/LC)
Lynda Schmitz Fuhrig, (SI Archives)
Pam Commerford (VOA)
Shu-Wen Lin (SAAM)
Steve Berkley (LC AFC)
Taylor McBride (SI OCIO)
Tina Habash (NIH/NLM)

References from this talk

Initial list of Significant Significant Properties available - RvanVeenendaal OPF Blog: https://openpreservation.org/blog/2018/10/03/initial-list-of-significant-significant-properties-available/

The Significant Properties of Moving Images, Mike Coyne and Mike Stapleton, 2008, JISC: https://web.archive.org/web/20091118154024/http://www.jisc.ac.uk/media/documents/programmes/preservation/spmovimages_report.pdf

FADGI Creating and Archiving Born Digital Video, Part III. High Level Recommended Practices: http://www.digitizationguidelines.gov/guidelines/FADGI_BDV_p3_20141202.pdf

Help with IASA TC-07 for Born Digital Video!

Approach: Collaborative transparent authoring

Expectations: Do what you can. Bite of a chunk and write two paragraphs about something you know.

Platform: Open collaborative platforms now being investigated

Aim: firstly, to demystify The Digital Video Trinity – not 1 x format (usually 3 x formats: container, video codec, audio codec)

Contact: Somaya Langley, our fantastic, kind and generous ring-leader - borndigitalvideo@gmail.com; @criticalsenses)

thank you / questions

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