Against the Grain

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Audio-Visual Collection Preservation at the NARA

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Audio-Visual Collection Preservation at the National Archives and Records Administration

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Audio-Visual Collection Preservation at the U.S. **National Archives and Records Administration (NARA)** is home to an estimated 700,000 reels of motion picture film and an estimated 850,000 audio and video recordings. The motion picture collection contains content ranging from 1896 in the form of an Edison film snippet sent in as part of a patent registration to content created by agencies, including **NASA**, as recently as a few years ago. The audio collection contains formats ranging from wax cylinders to digital audio tape (DAT), and the video collections has formats ranging from 2" Quad to HD CAM SR. For the most part, all of motion picture, audio, and video records were created by the Executive Branch of the Federal Government including all branches of the military and notable agencies such as the **Department of Agriculture (USDA)**, **National Park Service (NPS)**, and **Federal Bureau of Intelligence (FBI)**.

The collection is in climate-controlled storage onsite at **Archives II** in College Park, MD as well as in underground vaults in Lenexa, KS. The research room at **Archives II** is open to the public, and researchers may request viewing copies of unclassified holdings as well as purchase broadcast quality copies through approved **NARA** vendors.

Audio and Video Preservation Laboratory

The Audio-Video Laboratory at the **National Archives** is chiefly responsible for the preservation reformatting of **NARA's** audio and video collections. The Lab is also instrumental in the creation and delivery of access derivatives for the research room, **NARA's** online catalog, Freedom of Information Act requests, and special requests by members of Congress and other political figures. The Lab also supports and contributes to the preservation and access work of Presidential Libraries, the Regional Archives, Legislative Archives, and the National Declassification Center. The Lab serves as a source for not only direct preservation reformatting but also for information and assistance pertaining to analog and digital formats and related playback equipment, metadata schemas, file specifications, digitization equipment specifications and workflows, quality control and assurance processes, handling of archival material, repair and stabilization of media, as well as data management and storage requirements.

The Laboratory is physically divided between audio and video formats with data connectivity between the two areas. The Preservation Specialists within the Lab work across both formats equally, but each specialist has an area of specific expertise. Whether that may be format specific, equipment specific, or archival in nature depends on the individual. This allows for greater attention to detail in the processes, ensuring a higher quality of work, as well as keeping up to date with new technical and archival trends and technologies. The Audio-Video Laboratory staff has varied backgrounds which include evolving technologies, audio and video engineering, maintenance and support, library science and archival management, as well as broadcast industry experience. In encompassing such varied skills pertaining to archival audio and video, the Lab has been extremely successful in meeting **NARA's** preservation and access goals. In many cases the staff of the Audio-Video Lab have a direct hand in moving **NARA's** digital preservation and access processes forward.

The Audio Lab has been digitizing audio for preservation for 10 years. This includes a transition from 1/4" analog audio tape as the previous preservation format. The Lab started with the purchase of two turnkey Digital Audio Workstations (DAWs). This purchase spurred development of internal specifications and building additional audio systems in-house. The Lab spent those formative years experimenting with different capture software, configurations, and restoration tools and working to integrate digital process into **NARA's** workflow. The Audio Lab purchased and installed a batch derivative server allowing for quick trans-coding of audio preservation files to meet the needs of researchers and the *National Archives Catalog*. The derivative server included software tools for inspecting and performing quality-control processes of the newly created files. This ensured a greater level of quality while allowing a higher volume of material to be digitized and processed. Since implementing those tools the Lab has upgraded the functionality and added additional systems to aid in the preservation and access process.

The Audio Lab has the ability to playback many formats, most of which are obsolete and no longer supported. Some formats include analog open reel tape, audio cassette, Sound Scribers, Gray Autograph discs, wire recordings, DAT tapes, and transcription discs from various periods and construction. The Audio Preservation Specialists spend considerable time prepping, repairing, and cleaning the audio media for safe and transparent playback to ensure a transparent and proper digital capture.

The Video Lab has been digitizing video media for seven years. In the past Digital BetaCam served as **NARA's** preferred preservation format, but as the format moved toward obsolescence the Lab staff spent a considerable amount of time researching file formats and codec options for digital preservation. The access format was decided based on the specifications for **NARA's** online catalog. The Lab acquired several turnkey solutions for video preservation and access, as well as the in-house build of numerous video workstations for supporting particular access projects. The Video Lab has installed a robotic digitization system capable of digitizing the 3/4" U-matic tape format. Video Preservation Specialists have worked to improve the QC process of the robotic system with in-house designed software capable of reviewing the quality of the digitization process. This software allows for variable parameters to be analyzed. Very much like the Audio Lab, the Video Lab has in-house systems that create derivatives in batches and carry out quality-control and assurance processes. The design and operation of these systems allow the Video Lab to create a higher-quality end product and greater throughput to meet **NARA's** digitization goals.

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Criss Kovac is the supervisor of the Motion Picture Preservation Lab at the **National Archives and Records Administration**. Over the course of the last decade she has overseen preservation projects including *Nine From Little Rock*, *A Year Toward Tomorrow*, *With the Marines at Tarawa*, *The Negro Soldier*, *Let There Be Light*, and *The March*. She is currently working on the digital restoration of **Eva Braun's** home movies. She is an active participant in multiple moving image professional organizations and in creating technical guidelines for archives, libraries, and museums. She holds degrees from **Oberlin College**, **The Nottingham Trent University**, and **The L. Jeffrey Selznick School of Film Preservation**.

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The Video Lab supports many of the industry's obsolete formats as well as many of today's High-Definition video tape/disk-based formats, including 3/4" U-matic, 1" Type C open reel, 1/2" EIJA open reel, Betamax, BetaCam, Hi8mm, VHS, S-VHS, D2, DVCPRO, Digital BetaCam, BetaCam SX, HDCAM-SR, D5, DVCPRO-HD, XD-CAM, and others. Similarly to audio media, Video Preservation Specialists spend much time prepping, cleaning, and repairing video media for safe and transparent playback for digital capture.

Overall, the Audio-Video Preservation Laboratory at the **National Archives** is a well-equipped and expertly staffed facility, trained in the preservation and reformatting of obsolete and difficult formats while keeping in step with the latest technologies, formats, processes, and technical and archival standards.

Motion Picture Preservation Laboratory

Whenever possible, **NARA** strives to retain three copies of motion picture records — a Preservation copy that is contained in deep storage, an Intermediate copy that is readily accessible to fulfill vendor requests, and Reference copies to be served in the research room.

To accomplish this mission the collection is preserved and made accessible by staff of the Motion Picture Preservation Laboratory. The Film Preservation Lab is located at **Archives II** and is one of the last fully operational photochemical labs in the country. A small staff of five is responsible for several major activities — preservation, technical processing, vendor inspection, creating access copies, and digital restorations. Staff expertise ranges from traditional film editing and production, photochemical lab operations, digital editing and post production, library science, archival science, and film preservation specific training. Among all staff members we have over 100 years of experience.

For films requiring preservation the film is assessed by hand, and specialists repair damage, measure the film for shrinkage, determine the level of vinegar syndrome for acetate materials, and assess the overall preservation risk for each reel. The film is then preserved photocehmically by creating a new copy on polyester-based film stock using one of our five film printers, developing the film, and performing quality control on the new copy.

The Film Preservation Lab staff assists the archival unit by performing technical processing inspection. Once the archivists have determined which titles to accession from Federal Agencies, the film is sent to the Lab for the Preservation Specialists to determine which copies of the film should remain at **NARA** if there are multiple copies or versions of each title. The most original copy and/or the copy in the best physical shape will be retained as the Preservation copy; the second best copy will be retained as an Intermediate Copy, and if there is a serviceable film print that will be retained as the Reference Copy. In addition to making these determinations, staff are also able to address preservation concerns as soon as the film is brought into the collection.

Not all titles have multiple copies, but **NARA** makes every effort to provide the public with the records they need access to. In order to make content available, **NARA** provides Preservation copies to vendors for other institutions or production companies to gain access to the records. Staff in the Lab inspect all of the reels for vendor requests before they are sent to an approved facility and after the originals are sent back. This ensures that reels in need of preservation are not sent to a vendor and that no damage has occurred while the film has been out of **NARA's** custody.

To increase access to the collection the Film Preservation Lab staff creates access copies that are served in the Research Room and/or uploaded to the *National Archives Catalog*, You Tube, and Amara. All 35mm and 16mm films are captured in High Definition (HD) at 1920 x 1080 resolution. For long-term storage we retain uncompressed HD AVI files in our tape library, and for ease of access we create HD MP4 (H.264) files that are stored on local network attached storage. As **NARA** lacks a dedicated infrastructure to deliver files to the research room, Lab staff create DVDs that researchers can view and make copies of in the research room. Certain titles that are of high public interest or are part of our WWI & WWII scanning project are also uploaded to **NARA's You Tube** channel and into **Amara**, where individuals can tag and transcribe content to make titles more accessible or available in multiple languages.

The last major activity done in the Film Preservation Lab is restoration projects. While photochemical means are used to preserve the holdings, our digital restorations are meant to provide enhanced access to the public to provide them with a glimpse of how a film would have looked at the time it was originally shown. 35mm film is scanned in at 4K, and most 16mm film is scanned in at 2K. We capture DPX files, which is a file format designed to capture the intrinsic qualities inherent in film. Once the film is captured we utilize our restoration software to correct for shifts in color and exposure and to remove dirt, dust, scratches, flicker, and other defects introduced through time and use. We capture the audio using specially developed equipment to handle deteriorated magnetic tracks or optical tracks and use a different software program to reduce hiss, noise, clicks, or pops. The separate image file and audio file are then synched and brought into yet another software program to create digital cinema copies that can be shown in theaters. To date **NARA** has restored *Let There Be Light, The Negro Soldier, The March, The True Glory,* and *Nine from Little Rock.*

To learn more about the Motion Picture and Audio and Video Collections at **NARA** and the types of work done here we encourage interested parties to visit our blog, preservation guidelines, or view *Out of the Dark: Bringing Films to Light at the National Archives*.

Jason Love is the Supervisory Audio-Video Preservation Specialist in the Audio-Video Preservation Laboratory at the **National Archives** in College Park, MD. His experience in the Audio and Video field spans over 20 years, which includes work in commercial recording facilities, live concert sound, audio-video system design, repair and installation, sales of professional recording and sound reinforcement systems, facility design and implementation, audio-video preservation and digitization, and participation on technical standard committees, and he is a member of the **Audio Engineering Society**.

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effort should be created? If so, should it be a new, distinct non-profit organization, or perhaps a broad initiative among entities already concerned with related matters?

If you'd like to learn more about this or send comments, we'd like to hear from you! Contact us at <chris@mullermedia.com>.

Endnotes

1. One example: the content of 9,000 government mainframe cartridges fit on one inexpensive USB hard drive, so future backup/migration efforts are tiny compared to reading all those old tapes.
2. Just don't ask about **Sandy Berger's** visits to **NARA**.
3. A handwritten note from a Whitehouse staff meeting several weeks before the records disappeared contained the phrase "vacuum Rose records" (apparently a total coincidence).
4. Part of the **Minnesota Population Center**.
5. Those particular drives didn't rely on track index holes.
6. Can't resist this quote. A young **Lee Trevino** was asked if he felt lucky to have gone from a poor Latino teenage caddy to a world-famous golf pro. "Yup," he said, "and the more I practice the luckier I get."