Management of Video Recordings and Images Taken from Truck-Mounted Cameras

Synthesis Report

CLEAR ROADS

research for winter highway maintenance

CTC & Associates LLC

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16. Abstract

The ease of use of digital cameras and the augmented ability to network these cameras with transportation management systems and operational dashboards raise critical questions for transportation agencies about collecting, storing and managing the video recordings and images generated from cameras installed in agency vehicles and other equipment. This report synthesizes information from transportation agencies that have implemented policies, guidelines and processes for managing video recordings and still images. Twenty-eight transportation organizations responded to a survey that examined the types of vehicles that carry on-board cameras and the means of video and image storage. Retention periods for video data are described, including some that are dictated by statutes or policies and others that are a result of limited data storage capacity. Processes for sharing information with the public, media, law enforcement and others address record requests and typical requesters, specific limitations, fees and redactions. Best practices shared by these agencies offer ideas for simplifying data management and records requests. In addition to the survey results, a literature review provides information on completed and in-process research conducted on transportation video recordings and related operational topics.

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Abbreviations and Acronyms

AVL	automated vehicle location
AVLTS	automated vehicle location and telematic system
CCTV	closed-circuit television
DOT	department of transportation
FOIA	Freedom of Information Act
GRAMA	Government Records Access and Management Act (Utah)
IT	information technology
JTRP	Joint Transportation Research Program (Indiana)
MARWIS	Mobile Advanced Road Weather Information Sensor
MDC	mobile data computer
MDSS	maintenance decision support system
MnDOT	Minnesota Department of Transportation
NDOT	Nevada Department of Transportation
NRS	Nevada Revised Statutes
OIT	Office of Information Technology (New Hampshire)
RWIS	road weather information system
SD	secure digital
TMC	transportation management center

Executive Summary

Many transportation agencies capture video recordings and images related to safety, operations and performance. With advances in technology and access to more visual information, these agencies are seeking policies and practices for properly managing the data.

Clear Roads members are interested in current policies and strategies for managing video recordings and images, including:

- Practices for capturing, storing and sharing transportation-related video recordings and images.
- Retention policies and practices, and statutory or administrative retention requirements for these files.
- Practices for responding to open records requests.

This synthesis project surveyed winter maintenance professionals and reviewed relevant literature to gather information that will aid transportation agencies in implementing policies and practices to manage the recorded videos and images captured by truck-mounted cameras.

Survey of Winter Maintenance Professionals

Thirty-four respondents representing 28 agencies or organizations responded to a survey that examined aspects of capturing, retaining and managing video recordings and images collected by cameras installed on snowplows and other heavy equipment used for winter maintenance. Eighteen of these respondents, representing 13 state departments of transportation (DOTs), a Michigan county and one Canadian city, described experiences with transportation-related video recordings and images.

Collecting, Storing and Sharing Video Recordings and Images

Sources of and Storage for Videos and Images

The most prevalent source for obtaining videos and images is the forward-facing snowplow camera, as affirmed by all 18 respondents. The second most common source is the 511 camera, which is used by six agencies (33% of the responding group). Drones and snowplow rear-facing cameras collect video recordings and images for four agencies each (22% of the responding group). Other options, including snowplow driver-facing cameras and various safety service patrol cameras, are used by less than 15% of participants.

Many agencies rely on the storage capacity of the on-board cameras themselves, the capacity for which they describe between 40 and 72 hours of recording time. If the recording is not requested within that time frame, the data is overwritten as the camera continues to collect video and images during operations. Some cameras are equipped with memory cards that can be removed from the camera and connected to another computer or storage device for downloading images. These memory cards have storage between 64 and 128 GB. One respondent indicates that 64 GB represents approximately 75 hours of video recording time.

For vehicle-installed cameras, at least one agency relies on cellphone coverage to download images from the vehicle to another storage location, using the on-board storage as a backup when cell coverage is lacking. Some agencies have on-premises servers for downloading and storing videos and images. Other agencies contract with third-party cloud-based storage providers that give them significantly greater storage capacity without the need to invest in additional hardware infrastructure.

Using and Sharing Video Recordings and Images

Among the survey respondents, the four most common uses for stored video recordings and images are, in order of frequency:

1. Winter maintenance level of service.
2. Responding to citizen complaints.
3. Winter maintenance performance measurement.
4. Emergency operations.

Although there are many others ways these images could benefit agencies — such as use for online training material, marketing and communications, or social media — the agencies' priorities demonstrate a primary focus on safety and service to the motoring public.

In this same vein, many agencies are most likely to share recordings and images with law enforcement when requested in connection to an incident. There is consensus among some agencies that limiting access, whether through official policy or informal guidelines, is the best approach. In at least two cases, this is the reason states do not make more effort to record or store videos for longer periods of time.

Six DOTs share video recordings in conjunction with agency-sponsored research, either partnering longer term with universities or responding to ad hoc requests.

Retention Policies and Practices

Formal retention policies for video recordings and images collected by DOT on-board cameras among the respondent group are rare. One state, Utah, has an official policy for in-vehicle cameras that lists the conditions under which recordings may be preserved, such as:

- Departmental training needs.
- Law enforcement requests related to an incident investigation.
- Investigations of personnel or risk matters.
- Supervisory checks of equipment and personnel to ensure adherence to policy.

Another respondent, the City of St. John's (Canada), has an electronic surveillance policy that applies broadly to all surveillance cameras in any city facility, not only transportation-related videos. Similarly, one Michigan respondent indicates that Michigan's broader state record retention schedule applies to the DOT-collected videos.

Ohio DOT's guidance, not a formal or legally defined policy, is dictated by the capacity of its storage unless or until a request is made that may prompt the agency to pull and preserve specific footage. Because many states overwrite their footage due to limited storage capacity, requests must be made within the window the storage allows, ranging from 24 to 75 hours.

When footage is identified, and particularly when it is part of a law enforcement investigation, some agencies may preserve it for seven to 10 years (*Connecticut, Michigan*) or until the matter has been resolved (*City of St. John's, Nevada, Utah*). States like Michigan that use third-party storage services may be able to extend retention beyond policy requirements, depending on their vendors' capacity.

Transportation agencies consider a range of factors when establishing retention periods. The most important contributing factors are the Freedom of Information Act (FOIA) or other open records

requests, state law, federal law, usefulness to agency operations and usefulness for law enforcement or legal investigations.

Contractual, Statutory or Administrative Requirements

Transportation agencies adhere to existing policies or communicate guidelines for the retention of video recordings and images as general parameters. These dictates can include descriptions of conditions for proper usage of the material, as in Utah DOT's policy for in-vehicle camera operations, which requires approval from the deputy director before any video recordings are released by request. Similarly, the Nevada DOT respondent referenced the agency's policy, currently under development, that describes what can be shared with the public.

Nondisclosure Language

Six transportation agencies use nondisclosure language in contracts or agreements that limits the sharing of transportation-related videos or images. Nevada and Utah DOTs have developed policies with safeguards to ensure that proper permissions are given before video recordings are released or that define the types of video recordings that may be requested by entities outside of the agency. Contracts in North Dakota include an automated vehicle location (AVL) and maintenance decision support system statement. Michigan DOT requires that a data sharing agreement accompany contracts.

Statutory or Administrative Requirements

Five respondents reported on statutory or administrative requirements for retaining video recordings and images. One respondent, Minnesota DOT, is currently developing its policies, and Ohio DOT has existing state legislation regarding records retention and public access.

Records Requests

Responding to Records Requests

Respondents reference a range of practices for managing public requests for video recordings or images. Some guidelines are dictated by state statutes and model federal FOIA requests. Montana currently only responds to law enforcement requests. Public requests in Utah require review by the agency's deputy director. Nebraska does not specify its policy, but indicates that videos or images must be provided if they exist.

Fee Assessment

Multiple responding agencies indicate that fees may be assessed based on the size and scope of the request. It is common practice to provide a certain number of hours of work without assessing a fee, and then charging an hourly rate for any time beyond this initial period.

Redacting information

Practices related to redacting portions of videos or images because of privacy concerns were reported by four agencies. Information is redacted if required by law or if appropriate in some cases. In Connecticut, it may be redacted if personal or third-party details are present. The decision to redact in Utah relies on the deputy director's review.

Third-Party Use

Three respondents have policies addressing third-party use of videos or images that are publicly accessible online:

- Iowa DOT allows media outlets to "grab" still plow cam photos for news and weather broadcasts and for social media posts.
- Montana DOT requests proper attribution when any of its photos are used.
- Prior written permission from Nevada DOT is required before its images can be shared.

Best Practices for Managing Video Recordings and Images

Below are best practices shared by survey respondents for managing video recordings and images:

Collecting, Storing and Sharing Video Material

- Control access to stored images (*Indiana*, *Minnesota*, *Nevada, Utah*).
- Establish policies and practices (*Canada* (*City of St. John's), Michigan (Region Support), Nevada, Ohio*).
- Limit recording and storage (*Connecticut*, *Nebraska, Utah*).

Retention Policies and Practices

- Encourage submission as early as possible before video has been overwritten (*Connecticut*).
- Address unspecified safety concerns (*Michigan (Oakland County)*).
- Limit what is stored and length of retention based on storage capacity (*Utah*).

Providing Video Recordings and Images to the Public or Media

- Follow the state FOIA statutes (*Michigan (Oakland County)*).
- Review vehicle recordings before sharing (*Utah*).

Examining the Literature

An exploration of the literature sought to identify current policies and practices regarding the management of video recordings and images generated by cameras installed in transportation vehicles and equipment, including record retention and sharing practices. The search uncovered limited published research and resources related to video recordings and managing video data.

Previous Clear Roads Research

A 2021 state-of-the-practice literature review, survey and interview project sponsored by the Clear Roads pooled fund study identifies types, uses and best practices for on-vehicle camera systems. Camera placement and cleaning emerge as two critical elements of effective use, dictated by a driver's ability to see clearly and operate the vehicle unhindered. Also, transmission of live video from vehicles was not recommended at the time of publication due to poor cellular network coverage, particularly outside urban areas.

Agency Considerations for Video Recording, Retention and Sharing

Two Federal Highway Administration reports present technical, operational and legal considerations for retaining and sharing videos with parties outside of transportation agencies, including the public, media

organizations, first responders and towing companies. The 2016 report includes a survey with 19 transportation agency responses, offering perspectives on how often video feeds are recorded, how long they are archived, how requests are processed, and how risks and technical issues are managed. The 2019 report addresses political and legal questions, media and public relations issues, and infrastructure and security requirements. The report includes sample agreements and examples of video stream sharing from three states.

A June 2019 Iowa DOT study presents a summary of U.S., Canadian and European data collection practices for camera images and road weather information systems (RWIS), AVL, GPS and traffic data. A 2017 Minnesota DOT resource describes the deployment of dash- and ceiling-mounted cameras on 226 snowplows, representing approximately one-quarter of MnDOT's snowplow fleet. The report outlines operational and technical considerations, including driver, supervisor and public feedback.

Video Records Management Process and Policy

New Hampshire DOT provides an online resource for requesting logs or video transmissions from its archive. The site offers instructions for making the request and refers the requester to the statute that defines lawful use of the material. In a 2023 document, Washington's secretary of state publishes the state's records retention schedule, which includes references to transportation closed-circuit television (CCTV) records/video, video files of the state highway system and other examples of digital video records.

Video Data Innovations

A September 2024 presentation by Texas DOT describing research in progress addresses the need to update aging video decoders currently in use at all transportation management centers (TMCs). Through questionnaires and virtual meetings, the study seeks to uncover state-of-the-art CCTV-to-TMC practices in order to develop a new standard for distributing video. An August 2021 California Department of Transportation Preliminary Investigation explored the potential use of video analysis in monitoring traffic and detecting incidents. Seven states indicated their use of or interest in automated video analytics software to be integrated with traffic cameras.

Best Practices

Below are best practices from the 2016 Federal Highway Administration report *Transportation Management Center Video Recording and Archiving Best General Practices*:

Collecting, Storing and Sharing Video Material

- Work with information technology departments to ensure technical needs are met for managing video or image data, including integration into other agency systems.
- Use a consistent and searchable file naming system to reduce future search times.
- Maintain the ability to cut video feeds from public view in sensitive situations while preserving them for agency and emergency responder use.
- To lower storage costs, use a higher resolution for live viewing and a lower resolution for recording.
- Consider a video technology system that incorporates analytics tools and software, allowing for the analysis of camera images requiring less computer storage.

Requesting Video Material

- For video requests, implement efficient processes like a web-based request to limit manual entry; consider one process for public and law enforcement requests.
- Consider incorporating law enforcement personnel into video searching capabilities, as law enforcement represents a large share of video requests.

Providing Video Recordings and Images to the Public or Media

- To ensure integrity for legal use, consult with law enforcement, follow standard processes, and limit the number of staff that can access and fulfill requests.
- Work with agency counsel or FOIA officers to ensure records retention and access requirements are met when sharing video or image data.
- Maintain the ability to cut video feeds from public view in sensitive situations while preserving them for agency and emergency responder use.

1 Introduction

1.1 Background

Many transportation agencies capture video recordings and images related to safety, operations and performance. Networking these cameras with transportation management systems and operational dashboards raises critical questions for transportation agencies about collecting, storing and managing the data generated by truck-mounted cameras installed in the cabs of winter maintenance equipment.

Clear Roads members sought information about the current policies and best practices concerning the management of video recordings and images, including:

- Practices for capturing, storing and sharing transportation-related video recordings and images.
- Retention policies and practices and statutory or administrative retention requirements for these files.
- Practices for responding to open records requests.

1.2 Project Description

CTC & Associates conducted two primary tasks to gather information for this synthesis:

- *Survey of winter maintenance professionals*. An online survey distributed to member states of the Clear Roads pooled fund, the No Boundaries Transportation Maintenance Innovation pooled fund, and members of the Snow and Ice List-Serv sought information about practices for recording and managing transportation-related videos or images obtained from on-board cameras on snowplows and other heavy equipment.
- *Literature search*. An examination of publicly available domestic and in-progress research supplemented survey findings.

1.3 Survey Response

Thirty-four respondents representing 28 agencies or organizations responded to the survey. Eighteen of these respondents, representing 13 state departments of transportation (DOTs), a Michigan county and one Canadian city, described their agencies' experiences with transportation-related video recordings and images:

- City of St. John's (Newfoundland and Labrador Province, Canada)
- Connecticut
- Indiana
- Iowa
- Kansas
- Massachusetts
- Michigan (Oakland County)
- Michigan (Region Support)
- Michigan (Transportation Engineer)
- Minnesota
- Montana
- Nebraska
- Nevada
- North Dakota
- Ohio (Central Office)
- Ohio (District 10)
- Ohio (Maintenance Contracts)
- Utah

Three respondents provided additional context for their responses:

- *Kansas DOT* has only 12 dump trucks equipped with forward-facing cameras.
- *Minnesota DOT (MnDOT)* is in the early stages of gathering videos from a truck-mounted camera. The agency is currently developing many of its policies associated with this practice.
- *Montana DOT's* survey responses are "based upon truck-mounted camera video and images."

The remaining 16 respondents, representing 13 states and one consulting firm, do not record transportation-related videos or images:

- Alaska
- Idaho
- Illinois
- Kentucky
- Maine
- Maryland
- Mississippi
- New Hampshire
- Texas (Emergency Management Coordinator)
- Texas (Regional Crew Section Director)
- Vermont
- Washington
- Wisconsin
- Wyoming (DOT)
- Wyoming (Highway Patrol)
- Bolton and Menk (consulting firm)

Several of these respondents provided additional information about their agencies' current practices or future plans:

- The two *Texas DOT* respondents noted that the agency is considering installation of forward-facing cameras but does not plan to record or store any data. Unspecified research is also in process on this topic.
- *Vermont Agency of Transportation* has considered this technology but has not yet identified a need for it.
- *Washington State DOT* does not believe the in-cab cameras offer significant information that is not already available on the agency's hard-mounted traffic cameras.
- *Wyoming DOT* plans to collect images in the future.
- *Wyoming Highway Patrol* does not maintain snowplow-generated videos but does use videos recorded by commercial motor vehicles during crashes that are stored as part of video records related to a case. The agency also stores video taken from patrol cars, generally for five years depending on the type of officer-involved incident.
- Bolton and Menk uses videos, research, information and experiences from other sources to educate and inspire change toward lower salt use.

Survey questions are provided in Appendix A. The full text of survey responses, including respondent contact information, is available as a supplement to this report.

1.4 Organization of This Synthesis Report

Survey responses that address the collection, storage and sharing of video recordings and images are described in Chapter 2, including best practices related to granting storage access and establishing policies. Chapter 3 describes respondents' retention policies for video and image data and identifies the factors that determine how video data is retained. Examples of nondisclosure language, data sharing agreements and statutory requirements that govern state agencies are provided in Chapter 4. Chapter 5

highlights the processes used by members of the public to request access to video recordings and images, including online forms, fees and rules for redaction of confidential information.

While the survey conducted for this synthesis received responses from more than half of the Clear Roads membership, the survey findings do not serve as a representative sampling of all public transportation agencies. These results may, however, inform the practices of winter maintenance managers when developing policies and processes for managing video recordings and images captured from truck-mounted cameras.

2 Collecting, Storing and Sharing Video Recordings and Images

2.1 Introduction

Of the 28 agencies that responded to the survey, 15 record videos or retain images of transportation-related activities and events from on-board cameras on snowplows or other heavy equipment.

Respondents described the types of vehicles and sites where cameras are deployed and the storage locations for generated video data. Sample policies for granting access and best practice recommendations for using and sharing videos and images with other agencies, organizations and partners are highlighted below.

2.2 Sources of and Storage for Videos and Images

Survey participants offered information on how cameras are deployed in agency operations and video recordings and images are stored. Respondents also described the different ways their agencies use and share these recordings.

Sources of Videos and Images

Transportation agencies may obtain videos and images from a variety of sources. In some cases, videos and images may be recorded but not retained. All of the responding agencies retain videos and images captured by snowplow forward-facing cameras. 511 cameras are the next most likely source for video recordings or images, with six DOTs, or 33% of responding agencies, reporting this sourcing. Table 1 summarizes survey responses.

Table 1. Sources of the Videos and Images Retained by Respondents

State/Country (Municipality or Contact)	511 Cameras	Drones	Snowplow Forward-Facing Cameras	Snowplow Driver-Facing Cameras	Snowplow Rear Cameras
Canada (City of St. John's)			X		X
Connecticut		X	X		
Indiana	X		X		
Iowa	X		X	X	X
Kansas			X		
Massachusetts	X		X		
Michigan (Oakland County)			X	X	X
Michigan (Region Support)			X		
Michigan (Transportation Engineer)			X		
Minnesota			X		
Montana			X		
Nebraska	X		X		
Nevada			X		X

State/Country (Municipality or Contact)	511 Cameras	Drones	Snowplow Forward-Facing Cameras	Snowplow Driver-Facing Cameras	Snowplow Rear Cameras
North Dakota	X	X	X		
Ohio (Central Office)	X	X	X		
Ohio (District 10)			X		
Ohio (Maintenance Contracts)			X		
Utah		X	X		
Total	**6**	**4**	**18**	**2**	**4**

Table 1. Sources of the Videos and Images Retained by Respondents (Continued)

State/Country (Municipality or Contact)	Safety Service Patrol Forward-Facing Cameras	Safety Service Patrol Driver-Facing Cameras	Safety Service Patrol Rear Cameras	Other Vehicle Forward-Facing Cameras	Other Driver-Facing Cameras	Other Vehicle Rear Cameras
Canada (City of St. John's)				X		X
Connecticut	X					
Massachusetts				X		
Nevada						X
Utah	X	X	X			
Total	**2**	**1**	**1**	**2**	**0**	**2**

Respondents reported other sources for the videos and images that their agencies retain for some period of time:

- *Attenuator trucks*. Attenuator trucks have rearward-facing cameras (*Nevada*).
- *Cellphones in mobile RWIS*. Several snowplows and "a couple dozen supervisor vehicles" employ cellphones that are connected via Bluetooth to a mobile road weather information system (RWIS). For these installations, cellphones mounted on the dash or windshield will record an image every 15 seconds that is stored on the server maintained by the agency's RWIS vendor (*Massachusetts*).
- *Other vehicles*. Most city vehicles have dashcams that store data. Many winter maintenance vehicles also have side or wing cameras. Garbage trucks also have additional cameras near the lift arm (*City of St. John's, Canada*).

At the time of the survey's distribution in late summer/early fall 2024, Iowa DOT had just transitioned to a new automated vehicle location (AVL) vendor that incorporates forward-facing, operator-facing and rear-facing cameras. The agency disabled the operator-facing cameras while testing, evaluating and developing its safety program related to operator-facing cameras.

North Dakota DOT also obtains recorded videos and images from its Mobile Advanced Road Weather Information Sensor (MARWIS) and AVL system. MARWIS, designed for installation on a vehicle, collects

road and weather data while in motion, using GPS to track the vehicle's location. An AVL system also uses GPS to track fleets of vehicles, and with appropriate connectivity and software it can feed information to a centralized application or dashboard.

Items Stored and Storage Media

The types of video recordings and images vary by respondent, as does the medium in which these video and image files are stored. Tables 2 through 5 provide details of the primary types of storage options that responding agencies use to retain the recordings and images they capture:

- **On-board storage.** Cameras may be equipped with integrated storage capacity. Respondents with such cameras cite capacity of between 40 to 72 hours of recording time. Montana DOT considers this on-board storage as a backup option when the equipment loses cellphone coverage. For Iowa DOT, a download of any on-board files must be requested before they are overwritten with new images. Ohio DOT uses a Dell Edge Gateway 3001 that can collect and store data from multiple devices.
- **On-premises server.** This storage is kept on-site at a state agency location and maintained by agency information technology (IT) employees. The City of St. John's and Iowa DOT use on-premise servers. North Dakota DOT relies on its servers for 511 camera images, and Ohio DOT uses a Milestone server.
- **Third-party cloud-based storage.** Accessible through an internet connection, cloud-based storage is provided as a service by technology companies to offer expanded storage capacity. Connecticut DOT's service patrol trucks store images for 30 days on a Samsara cloud-based server. Indiana DOT stores some images in the cloud through its partnership with Purdue University. Twelve additional states use cloud-based storage, many for snowplow and 511 cameras.
- **Memory card.** This small storage device inserted into a camera can be easily extracted to transfer video files to other storage locations such as individual computers or agency servers. Five agencies use memory card storage. MnDOT cameras each have 128 GB storage cards; Nevada DOT reported 64 GB storage that can capture up to 75 hours of video before it is overwritten.

The Utah DOT respondent also noted that its safety service patrol occasionally saves requested videos or training videos to Google Drive.

Table 2. On-Board Storage of Recordings and Images

State (Municipality or Contact)	Source/Description
Connecticut	Local storage for snowplows on maintenance decision support system (MDSS); recordings used for post-storm review.
Indiana	Images from stationary cameras and forward-facing cameras installed on most of the agency's plow trucks are stored in a data warehouse.

State (Municipality or Contact)	Source/Description
Iowa	Forward-facing and rear-facing cameras capture video that is stored on the device: • Approximately 40 hours of storage on the device installed in agency's snowplow trucks. • Ability to download video into an MP format provided the download is requested before the video has been overwritten.
Montana	Cameras have on-board storage to record video when the unit is out of cellular coverage.
Nebraska	Store and forward only.
North Dakota	Drone video and images are stored.
Ohio (Central Office)	Dell Edge Gateway 3001 Intwine Connected Gateway
Ohio (District 10)	Pictures and videos are stored.
Ohio (Maintenance Contracts)	Videos and photos stored for 72 hours on device.
Utah	Cameras on plow trucks and safety service patrol are equipped with on-board storage.

Table 3. On-Premises Storage of Recordings and Images

State/Country (Municipality or Contact)	Source/Description
Canada (City of St. John's)	Videos and images are downloaded as needed.
Iowa	IT staff stores all still photos that are generated from the trucks and posted to 511.
North Dakota	511 camera images
Ohio (Central Office)	Milestone on-premises server

Table 4. Third-Party Cloud-Based Storage of Recordings and Images

State/Country (Municipality or Contact)	Source/Description
Canada (City of St. John's)	Not provided.
Connecticut	Service patrol trucks store images for 30 days on the Samsara server.
Indiana	Purdue University through the agency's Joint Transportation Research Program (JTRP) stores some of the agency's images.
Kansas	Video of forward-facing snowplow cameras.
Massachusetts	Applies to the couple of dozen mobile RWISs.
Michigan (Oakland County)	Photos with to ability to retrieve videos.
Michigan (Region Support)	Snowplow forward-facing cameras.
Michigan (Transportation Engineer)	Forward-facing camera images from snowplows that capture and store only still images.
Minnesota	Geotab and Surfsight dash cameras.
Montana	Snowplow camera video recordings.

State/Country (Municipality or Contact)	Source/Description
Nebraska	511 and snowplow forward-facing camera
Nevada	Cloud storage from the cameras is used for incidents/events like accident triggers only.
North Dakota	Snowplow forward-facing images
Ohio (Maintenance Contracts)	Store all GPS data points and photos for five years. Video is stored for one year when saved from the truck's camera.

Table 5. Memory Card Storage of Recordings and Images

State/Country (Municipality or Contact)	Source/Description
Canada (City of St. John's)	Not provided.
Minnesota	Each camera has internal 128 GB storage card.
Nevada	All cameras are Level3_720P_15FPS using a 64 GB SD Card and can store up to 75 hours of video before it is overwritten.
Ohio (District 10)	Videos and images are stored on memory cards.
Utah	Cameras on plow trucks and safety service patrol are equipped with memory cards.

2.3 Using and Sharing Video Recordings and Images

In the process of collecting visual data to manage transportation needs and events, agencies find themselves in possession of videos and images that can be of use in ways beyond their original intention. This section explores the most common uses of the video data by internal agency employees, external partners and other requesters. It also catalogs recommendations for guidelines and policies to ensure proper use and control of data.

Internal Uses

Transportation agencies may use archives containing video recordings and still images in a variety of ways. For the 15 agencies responding to the survey, the most common use of collected recordings and images is for tracking winter maintenance level of service. The next most likely uses reported by respondents were responding to citizen complaints, winter maintenance performance measurement and emergency operations. Table 6 summarizes survey responses.

Table 6. Internal Uses of Archival Video Recordings and Still Images

State/Country (Municipality or Contact)	Emergency Operations	Marketing and Communications	Online Training Materials	Personnel Discipline	Platforms Interpreting Road Conditions	Responding to Citizen Complaints
Canada (City of St. John's)	X					X
Connecticut						X
Indiana	X				X	X
Iowa						X
Kansas						X

State/Country (Municipality or Contact)	Emergency Operations	Marketing and Communications	Online Training Materials	Personnel Discipline	Platforms Interpreting Road Conditions	Responding to Citizen Complaints
Massachusetts						
Michigan (Oakland County)	X		X	X		X
Michigan (Region Support)						
Michigan (Transportation Engineer)						X
Minnesota		X			X	X
Montana						
Nebraska	X					
Nevada	X			X		
North Dakota		X				
Ohio (Central Office)	X					X
Ohio (District 10)	X				X	X
Ohio (Maintenance Contracts)	X	X	X	X		X
Utah	X	X	X	X	X	X
Total	**9**	**4**	**3**	**4**	**4**	**12**

Table 6. Internal Uses of Archival Video Recordings and Still Images (Continued)

State/Country (Municipality or Contact)	Security	Social Media	Traffic Analytics	Winter Maintenance Level of Service	Winter Maintenance Performance Measurement
Canada (City of St. John's)				X	
Connecticut	X			X	X
Indiana		X	X	X	
Iowa					
Kansas				X	
Massachusetts				X	X
Michigan (Oakland County)		X		X	X
Michigan (Region Support)				X	X
Michigan (Transportation Engineer)				X	X
Minnesota		X		X	
Montana		X			
Nebraska				X	X
Nevada				X	X
North Dakota					
Ohio (Central Office)	X		X	X	
Ohio (District 10)	X		X	X	
Ohio (Maintenance Contracts)		X		X	X
Utah	X	X	X	X	X
Total	**4**	**6**	**4**	**15**	**9**

Montana DOT's internal development staff uses still images to conduct an artificial intelligence (AI) pilot. Other internal uses of recordings and images:

- Legal proceedings (*Nevada*).
- Risk management (*Utah*).
- Still images are accessible via 511 (*Iowa*, *Montana*).

Tips and Techniques Sharing Still Images from Iowa DOT's In-Cab Cameras

While Iowa DOT does not share the video recorded on a snowplow's in-cab camera, still images from these recordings may be widely distributed. Still photos captured from in-cab video recordings are pulled every two minutes, processed and posted to the agency's 511 website. These still photos are also available to media outlets for their use in news and weather broadcasts and on social media.

Agency staff also uses these still photos in a variety of ways:

- Posting images on the Traffic Operations dashboard and reviewing conditions at neighboring garages.
- Using images as a timing tool to know when to start treating portions of the roadway or when to start calling in staff if it is a weekend or after hours.
- Using images as supporting information when processing claims submitted to the department.

Sharing with External Partners

Transportation agencies may share recorded videos and still images with a range of partners, including:

- Federal, state or local public agencies
- Researchers funded by the agency

Federal, State or Local Public Agencies

Eight respondents noted that their agencies are most likely to share agency recordings and images with law enforcement agencies such as local police and state patrol, typically upon request and in connection with an accident or incident. The Michigan DOT Region Support respondent noted that the agency only shares live feeds with other government agencies. Table 7 summarizes survey responses.

Table 7. Sharing Recorded Content with Government Agencies

State/Country (Municipality or Contact)	Content Shared and Purpose
Canada (City of St. John's)	Police have requested video when they think city vehicles may have captured helpful information.
Connecticut	Content only shared when requested in connection with investigations.
Iowa	At the request of law enforcement, video will be shared when an accident or incident involves a DOT truck.
Minnesota	Videos have been shared with state patrol.
Nevada	Occasionally, representatives from Nevada State Police Highway Patrol request video recordings associated with an accident.

State/Country (Municipality or Contact)	Content Shared and Purpose
Ohio (Central Office)	Traffic camera videos are shared with law enforcement if requested by the agency.
Ohio (Maintenance Contracts)	Recordings or images are shared in response to a "valid request." Each request is unique and discretion is required when responding.
Utah	When requested, recordings or images are shared with law enforcement or for traffic incidences.

Tips and Techniques Repurposing Public-Facing Video and Images

For some transportation agencies, publicly posting video recordings and images may require added security controls to prevent outside entities from "scraping" public-facing video. Indiana DOT has employed additional security for its public-facing 511 website site to prevent scraping, while in Connecticut, information technology (IT) staff use unspecified tools with the DOT's traffic cameras. The Oakland County, Michigan, respondent also noted that IT security controls are employed to prevent scraping.

Third parties may also attempt to "grab" an agency recording or image online for posting on social media. Responding agencies reported these policies and practices:

- **Iowa DOT** allows the media to grab still images from snowplow cameras for use in news and weather broadcasts and for posting on social media. The agency's internal social media team uses the same photos to post on Iowa DOT social media platforms.
- **Montana DOT** requests that the grabbed image is attributed to Montana DOT.
- For **Nevada DOT**, any information grabbed from an agency website cannot be shared publicly without prior written permission from Nevada DOT.

Researchers Funded by the Agency

Among respondents, six state DOTs share video recordings and still images with the researchers funded by the agency:

- Shares with Purdue University, a partner in the agency's JTRP (*Indiana*).
- Provides as needed in connection with pooled fund-, agency- or university-sponsored research projects (*Michigan (Transportation Engineer)*).
- Provides recordings or images through a third party to aid in research addressing performance measurement and level of service (*Nebraska*).
- Provides unspecified images for research purposes (*North Dakota*).
- Shares recordings or images in response to a "valid request" (*Ohio (Central Office and Maintenance Contracts)*).
- Shares recordings or images associated with research on winter weather performance measures (*Utah*).

2.4 Best Practices

Nine agency respondents offered recommendations for collecting, storing and sharing video recordings and still images. The Iowa DOT respondent noted that the agency is "still too early in the process" to share best practices. Table 8 presents these best practices in three categories:

- Control access to stored images.
- Establish policies and practices.
- Limit recording and storage.

Table 8. Best Practices for Collecting, Storing and Sharing Video Recordings and Images

Best Practice	State/Country (Municipality or Contact) and Description
Control Access to Stored Images	*Indiana*. Limited authority is given for accessing and requesting stored images. Interested team members must make a formal request to leadership to obtain stored images. *Minnesota*. A very limited number of people have access to video footage. *Nevada*. For the most part, access rights to recordings are restricted to managers and other leaders. *Utah*. Anything shared with an outside entity must be approved by the agency's deputy director.
Establish Policies and Practices	*Canada (City of St. John's)*. Best practices are identified in the city's electronic surveillance policy. *Michigan (Region Support)*. The agency's policy is to retain images for 24 hours; access to the vendor's cloud images permits access to certain images beyond the 24-hour limitation. *Nevada*. Maintaining data retention policies specific to data-heavy projects like automated vehicle location and telematic system (AVLTS) projects protects the agency from exposing itself to potential liability. *Ohio (Central Office)*. The agency stores products for a predetermined time, and then they are deleted.
Limit Recording and Storage	*Connecticut*. The agency generally tries not to record due to storage and public requests. It limits recordings "the best we can." *Nebraska*. Video recordings are not stored or shared. Images are stored for 24 hours with third-party providers. *Utah*. The agency doesn't store products for a prolonged period of time because they take up too much space.

3 Retention Policies and Practices

3.1 Introduction

This section presents information about retention policies and practices for transportation-related video and image data, including storage limitations.

3.2 Retention Policies

Few agencies have a formal policy regarding the retention of transportation-related video recordings and images. Michigan DOT retains connected vehicle data for one year, but agency policy does not specifically address images captured by AVL cameras. (One of the Michigan DOT respondents commented that that the agency does not have "a universal policy that covers images and videos collected from all platforms.") Oakland County, Michigan, applies the state record retention schedule.

Ohio DOT retains video recordings and images for 72 hours, which coincides with the on-board storage capacity of the cameras installed in its vehicles (see Table 2, page 13). The City of St. John's electronic surveillance policy notes that "[d]ata obtained through electronic surveillance that has been used or is being used by the [c]ity in relation to an ongoing investigation or legal proceeding by the [c]ity or law enforcement officials shall be retained for a period not exceeding [s]even (7) years or until the legal proceedings are concluded."

Tips and Techniques Utah DOT's Video Recording Retention Policy

Utah DOT's In-Vehicle Camera Operations policy notes that "[r]ecordings will be overwritten as per the device storage requirements as memory becomes full, and they will not be retained except as provided for in this policy." The policy identifies the purposes for which the agency may retain and use recordings:

- Training or any other official internal department purpose.
- Requests from law enforcement or public safety organizations related to an incident investigation.
- Public or department protection, such as investigations related to personnel or risk matters.
- Requests under the Utah Government Records Access and Management Act (GRAMA).
- Random supervisory checks of equipment and personnel to ensure proper adherence to policies.
- Other uses identified by the agency's technical team.

Public information requests for images are numerous, so we don't retain them and only allow third-party providers to retain [images] for 24 hours.

— Nebraska DOT respondent

3.3 Retention Practices

Responding agencies described practices related to the retention of videos and images, including information about the length of data retention for video and image files and any policies or conventions that govern this activity.

Differing Retention Periods

Seven respondents reported that some categories of recordings or images may be subject to different retention periods given their sensitivity or relevance to ongoing investigations. Table 9 summarizes respondents' retention practices.

Table 9. Recordings and Images Subject to Nonstandard Retention Periods

State/Country (Municipality or Contact)	Description
Canada (City of St. John's)	Recordings or images associated with accidents or suspicious activity have an unspecified nonstandard retention period.
Connecticut	• Items used or pulled for investigation are retained for seven years. • All other items are allowed to expire in the system.
Iowa	• Retention policy under development at the time of the survey. • Respondent anticipates longer recording retention for legal cases.
Michigan (Transportation Engineer)	Traffic incident management records are retained for 10 years.
Nevada	• Accident videos are retained until the legal proceedings are completed. • Currently working on an AVLTS retention policy.
Utah	• Recordings related to employee accidents have a longer retention period and may be used for training. • Video recordings retained in connection with Government Records Access and Management Act (e) requests are retained until the request is completed.

Nine respondents reported that retention periods don't change for various categories of recordings or images (*Kansas, Michigan (Oakland County), Michigan (Region Support), Minnesota, Montana, Nebraska, North Dakota, Ohio (Central Office), Ohio (Maintenance Contracts)*). All states follow, or intend to follow, a similar practice of retaining recordings and images associated with a formal or legal investigation.

Retention Periods

Agency retention periods for the video recordings and still images they capture may be dictated by formal policy or adopted as common practice. Some respondents offered information about both approaches. Retention may also extend beyond the agency to its vendors. In some cases, a vendor repository will provide access that extends beyond that provided by the agency. Table 10 summarizes survey responses.

Table 10. Retention Periods: Policy, Common Practice and Vendor Availability/Access

State/Country (Municipality or Contact)	Policy Requirement	Common Practice	Vendor Availability/Access
Canada (City of St. John's)	• General: 90 days • Investigations or legal proceedings: 7 years or until the legal proceedings are concluded	As needed	No
Connecticut	7 years for investigations	As the images overwrite	Various lengths. May be 2 months; some only 30 days.
Kansas	No response	30 days	N/A
Michigan (Oakland County)	2 years	4 years, as determined by vendor capability or program functionality	4 years
Michigan (Region Support)	No response	24 hours	Unknown
Michigan (Transportation Engineer)	1 year	1 year	No
Minnesota	No	Case-by-case basis	• The camera overwrites when the secure digital (SD) card fills. • Videos would have to be manually downloaded from the cloud to retain for a longer time.
Montana	No	No	Length of the agency's customer/vendor relationship
Nebraska	No	24 hours for third-party images only	24 hours
Nevada	No response	75 hours; after this time, images are overwritten.	Vendor will be required to follow the agency's data retention policy.
Ohio (Central Office)	72 hours	72 hours	N/A
Ohio (District 10)	72 hours	72 hours	N/A
Ohio (Maintenance Contracts)	• Videos: 1 year • Still images: 5 years	No response	N/A
Utah	Within 48 hours	Overwritten after 2 to 7 days (48 hours of video)	N/A

N/A Not applicable.

Impact of Retaining Additional Products

Thirteen survey respondents reported no issues retaining a growing number of video recordings and images (*Canada (City of John's); Connecticut; Kansas; Michigan (Oakland County, Region Support, Transportation Engineer); Minnesota; Montana; Nevada; North Dakota; Ohio (Central Office, District 10, Maintenance Contracts)*). Storage space restrictions were noted by the Nebraska and Utah DOT respondents. Nebraska DOT's public information office places numerous requests for images, which are not retained. Only third-party providers are allowed to retain images for 24 hours.

*When asked about the impact of an **increasing number of video recordings and images** being captured and retained by transportation agencies, the Utah DOT respondent noted that storage space restrictions can be challenging.*

Establishing Retention Periods

Transportation agencies consider a range of factors when establishing retention periods for video recordings and images. Using the rating scale of 1 = not at all important to 5 = extremely important, respondents rated the importance of 11 factors that could impact their agencies' decision-making on retaining recorded videos and still images.

Table 11 provides the average scores for respondents' ratings. The two most important contributing factors are Freedom of Information Act (FOIA) or other open records requests, and state law. Least likely to impact retention periods are social media and marketing needs. Table 12 provides details of respondents' ratings.

Table 11. Rating the Importance of Factors Impacting the Establishment of Retention Periods

Factor	Average Score
FOIA or Other Open Records Requests	4.36
State Law	4.29
Federal Law	3.93
Usefulness to Internal Agency Operations	3.87
Usefulness for Law Enforcement or Legal Investigations	3.73
Internal Records Disposition Schedules	3.40
Statewide Records Disposition Schedules	3.27
Cost of Storage	3.20
Usefulness to Research	2.87
Social Media	2.00
Marketing	1.80

Table 12. Factors Impacting the Establishment of Retention Periods

State/Country (Municipality or Contact)	Cost of Storage	Federal Law	State Law	FOIA or Other Open Records Requests	Internal Records Disposition Schedules	Marketing
Canada (City of St. John's)	2	4	4	4	4	1
Connecticut	3	4	5	3	2	1
Iowa	3	5	5	5	4	2
Kansas	1	1	1	4	1	1
Michigan (Oakland County)	4	1	5	5	5	1
Michigan (Region Support)	4	5	5	5	3	3
Michigan (Transportation Engineer)	4	4	4	4	4	2

State/Country (Municipality or Contact)	Cost of Storage	Federal Law	State Law	FOIA or Other Open Records Requests	Internal Records Disposition Schedules	Marketing
Minnesota	3	3	3	3	3	2
Montana	3	5	5	4	4	2
Nebraska	2	5	5	5	5	2
Nevada	4	4	4	4	4	2
North Dakota	3	5	5	5	3	3
Ohio (District 10)	4	4	4	5	3	1
Ohio (Maintenance Contracts)	3	N/R	N/R	N/R	1	1
Utah	5	5	5	5	5	3
Average Score	**3.20**	**3.93**	**4.29**	**4.36**	**3.40**	**1.80**

N/R No response.

Table 12. Factors Impacting the Establishment of Retention Periods (Continued)

State/Country (Municipality or Contact)	Social Media	Statewide Records Disposition Schedules	Usefulness for Law Enforcement or Legal Investigations	Usefulness to Internal Agency Operations	Usefulness to Research
Canada (City of St. John's)	1	1	4	4	4
Connecticut	1	2	4	5	3
Iowa	2	4	5	4	2
Kansas	1	1	3	3	1
Michigan (Oakland County)	4	5	4	4	3
Michigan (Region Support)	2	3	4	3	3
Michigan (Transportation Engineer)	2	4	4	4	3
Minnesota	2	3	3	4	4
Montana	2	4	2	3	2
Nebraska	2	5	3	4	4
Nevada	3	4	5	4	3
North Dakota	3	4	4	4	3
Ohio (District 10)	1	2	3	3	2
Ohio (Maintenance Contracts)	1	2	3	4	3
Utah	3	5	5	5	3
Average Score	**2.00**	**3.27**	**3.73**	**3.87**	**2.87**

Best Practices

Three respondents offered best practices regarding the retention of video recordings and images:

- Recommend that requesters submit requests for video as early as possible given the overwriting of stored content. Often, this critical timing is overlooked and requests are made months after the images have been overwritten (*Connecticut*).
- Address unspecified safety concerns (*Michigan (Oakland County)*).
- Limit what is stored based on storage capacity (*Utah*).

4 Contractual, Statutory or Administrative Requirements

4.1 Introduction

Below is a brief discussion of agency use of nondisclosure language in contracts or agreements related to sharing transportation-related videos and images. Statutory or administration requirements related to video recording and image retention are also provided.

4.2 Nondisclosure Language

Six survey respondents reported on their agencies' use of nondisclosure language. In addition to using nondisclosure language, Michigan DOT must file a data sharing agreement. Nevada and Utah DOTs have developed policies with safeguards to ensure that proper permissions are given before video recordings are released or to define which types of video recording may be requested by parties outside of the agency. Table 13 provides a brief description of agency practices.

Table 13. Nondisclosure or Similar Language Addressing Video Sharing with Other Parties

State (Municipality or Contact)	Description
Indiana	Legal and IT policies require that images be stored only in-house.
Michigan (Oakland County)	General nondisclosure language is included in contracts.
Michigan (Transportation Engineer)	Contracts include nondisclosure language; the agency must also file a data sharing agreement.
Nevada	Videos cannot be disclosed to the public without the reason/intent known to the agency. Videos follow a particular data classification and retention policy. The agency has implemented some portions of the policy and is developing other elements of these policies.
North Dakota	Contracts include an AVL and MDSS statement.
Utah	The agency has developed an in-vehicle camera operations policy (Policy 06C-39). See below for details.

Utah DOT's In-Vehicle Camera Operations Policy

Utah DOT's policy UDOT 06C-39, In-Vehicle Camera Operations, defines "policies for the use of in-vehicle cameras and recording devices." The policy:

- Establishes the deputy director as the source of approval for any video recording requests.
- Limits the storage of recordings to the memory capacity in the device, except for instances outlined in the policy, such as training purposes or law enforcement investigations.
- Establishes a 48-hour deadline from the incident for filing a request, to ensure the recordings can be taken from the device before they are overwritten.
- Defines dashcam file recordings as department property.

4.3 Statutory or Administrative Requirements

Five respondents noted that their states have statutory or administrative requirements that transportation agencies must follow to retain video recordings and images (*Connecticut, Minnesota, North Dakota, Ohio (District 10), Ohio (Maintenance Contracts)*). MnDOT is currently developing relevant policies.

Ohio DOT has implemented one-year retention for video (when saved from a truck) and five years for photos. Section 149.34 of the Ohio Revised Code establishes procedures and standards for managing state agency records. The code does not make explicit mention of recorded videos or still images.

5 Records Requests

5.1 Introduction

Agency practices related to public requests for video recordings and images are presented in this section. Included in the discussion are agency requirements for responding to public requests, fees assessed (if applicable) and practices related to redacting portions of the videos or images to address privacy concerns. Third-party use and media access to these products are also discussed.

5.2 Responding to Records Requests

Respondents reported a range of practices for providing video or image records in response to requests from the public. In some cases, these guidelines are dictated by state statutes written to follow the model of the federal FOIA. Table 14 summarizes survey responses.

Table 14. Requirements for Public Requests for Video Recording and Images

Practice	State (Municipality or Contact) and Description
FOIA (Federal or State) Compliance	*Iowa.* The agency has one point of contact who manages all FOIA requests. *Michigan (Oakland County)*. The agency follows state FOIA procedures. *Ohio (Central Office)*. Most requests come in under FOIA.
Formal Public Request	*Ohio (District 10)*. Formal public requests are submitted through the agency's public information officers. *Ohio (Maintenance Contracts)*. A formal public request must be submitted for release of recordings and videos.
GRAMA Compliance	*Utah*. Public requests submitted within 48 hours under the state's GRAMA must be reviewed by the agency's deputy director.
State Records Schedule	*Nevada*. Formal public requests go through the agency's records management team, which is guided by the state records schedule and data retention policies.
Law Enforcement Requests Only	*Montana*. At this time, the agency only responds to law enforcement requests.
Other	*Michigan (Region Support).* The agency has a detailed procedure and guidelines. *Nebraska*. The agency must check if images are available and provide them if they exist.

5.3 Selected Agency Practices

Few respondents described agency requirements for responding to public requests for video recordings or still images. Below are brief summaries of the practices of two state DOTs — Nevada and Utah — that reference formal processes for responding to public requests for records.

Nevada Department of Transportation

Nevada DOT's Records Management Section develops the agency's records retention schedule and assists the DOT's divisions with complying with relevant agency practices and applicable regulations, including Nevada Revised Statutes (NRS) Chapter 239, Public Records.

Members of the Nevada DOT Public Records team are the first point of contact for public requests for records. An agency website, NDOT Public Records and Records Management, offers links to helpful references and access to an online form for the public's use in submitting a request for records. As the survey respondent noted, for the most part, access rights to video recordings is restricted to managers and above.

Requesting Records

Those wishing to request records are encouraged to use the agency's online request form or submit a request via email. Requesters are provided with guidelines for submitting the request and advised to be specific and provide as much information as possible about the request. Failure to include important details may delay the agency's response.

As required by the state statute, requesters will receive an initial email response to a public records request within five calendar days. Currently, the turnaround time to full respond to a public records request is three weeks given the volume of requests.

Redacting Information

If a record provided in response to a public request contains confidential information, the Public Records team will redact that information and provide the requester with a "Privilege Log" as required by NRS Chapter 239.

Tips and Techniques Online Portal for Utah Public Records Requests

Utah DOT's Public Records Requests (GRAMA Request Portal) provides guidance and describes the process for those seeking public records from the agency under Utah's Government Records Access and Management Act. Requesters are encouraged to "be as specific as possible when requesting records," and include such details as critical dates, precise location, project name, PIN Number, individuals involved, entity names and the name of the document. The portal clarifies certain agency practices:

- Utah DOT intersection cameras provide live feeds only and do not record or store footage.
- The agency does not maintain accident records that do not involve Utah DOT property.
- Records are classified as *private*, *protected* and *controlled.* The portal notes that "many of these exemptions are designed to protect privacy rights and legitimate business interests."

Utah DOT uses the JustFOIA public records management platform to manage its GRAMA process and procedure. Questions or mail requests can be directed to Utah DOT's GRAMA Coordinator. GRAMA establishes a time frame for responding to public records requests, which is generally 10 working days from receipt. This time frame is shortened to five working days for media requests.

Fee Assessment

Several agencies assess fees for providing requested video recordings or images. Three respondents described fee calculations based on the time and material required to produce the records (*Iowa, Michigan (Region Support), Ohio (Maintenance Contracts)*). Requests submitted through Utah DOT's GRAMA portal may be assessed fees to cover processing costs for large, vague or broad requests. In Connecticut, the fee is assessed by its legal team. The fee in North Dakota may include an hourly rate of $25 after the first free hour for locating the record, as outlined on the state's Open Records Guide.

Redacting Information

Four respondents described practices related to redacting portions of videos or images due to privacy concerns. The Connecticut DOT respondent noted that it depends on the video and whether it contains personal or third-party information. Other respondents reported that information is redacted if required by law (*Michigan (Oakland County)*) or if appropriate (*Ohio (Maintenance Contracts)*). In Utah, the decision to redact depends upon the deputy director's review.

> ***Recommended best practice:*** *Review all video recordings before sharing them.*
>
> — Utah DOT respondent

Third-Party Use

Three respondents have policies or guidelines addressing third-party use of videos or images that are publicly accessible via an agency web page or other online source:

- In Iowa, media outlets may grab still plow cam photos for news and weather broadcasts and for social media posts. The agency's internal staff also uses these photos on social media platforms.
- Montana DOT requires users to attribute the images to the agency.
- In Nevada, public sharing requires prior written permission and approval from the agency.

6 Examining the Literature

A literature search examined in-process, published research and other resources that address the capture, storage and management of transportation-related videos and images. The search extended beyond videos and images taken from truck-mounted cameras to examine other types of transportation-related videos and images, in particular those taken by closed-circuit television (CCTV).

6.1 Previous Clear Roads Research

Aftermarket Cameras in Winter Maintenance Vehicles, Mark Gallagher and Chris Curd, Clear Roads Pooled Fund, Minnesota Department of Transportation, June 2021.
https://www.clearroads.org/download/final-report-48/?tmstv=1738613508
From the abstract: Mounting video cameras on winter maintenance vehicles can assist with operational decisions and enhance situational awareness for operators. To help agencies maximize the benefits of these systems, this project conducted a state-of-the-practice literature review, survey and interviews to identify types, uses and best practices for on-vehicle camera systems.

Among the agencies surveyed, the most common use was a rear-view device, but cameras are also used to monitor material spreaders, underbody plows and tow plows to verify operation and effectiveness.

Several best practices emerged from the research and interview process. These included:

- Cameras should be carefully positioned so they do not interfere with driver sight lines or getting into or out of the vehicle.
- Cameras should have washer systems and heated lenses, as accumulation of dirt or snow can rapidly degrade image quality.
- Cameras are often sold as packages with washer systems. Research shows that low-cost cameras can be used with washer systems, even if they are not initially packaged with them.
- In-cab displays should be carefully positioned and have driver-adjustable brightness to avoid distracting reflections on windshields.
- In general, it is not recommended to integrate the video from forward-facing cameras into in-cab displays.
- Transmitting live video from vehicles is currently poorly supported by cellular networks, particularly outside urban areas, and is not generally recommended.
- Involving operators during the planning and installation of cameras has been shown to increase effectiveness and acceptance of the system.

6.2 National Research and Guidance

TMC Pooled Fund Study Member Presentations and Roundtable Discussions, Federal Highway Administration, September 2024.
https://transops.s3.amazonaws.com/uploaded_files/2024-09/2024%20TMC%20PFS%20Annual%20Meeting%20Member%20Roundtable%20Discussion%20slides_0.pdf
A series of state DOT presentations from a meeting of the Transportation Management Center (TMC) Pooled Fund Study included questions regarding private companies or individuals recording public feeds and reselling them (MnDOT; see slide 9) and video sharing (Washington State DOT; see slide 81).

A Texas DOT presentation discusses a statewide CCTV video requirements study to document distribution of CCTV camera feeds to monitors at the TMC. *From the presentation (see slide 91)*:

> Due to the end-of-life analog video decoders currently being used at all TMCs, a new standard to distribute video to TMC operator monitors is being developed.
>
> The study is in the data gathering stage with questionnaires and virtual meetings for data gathering sessions taking place.
>
> The final deliverable will be a report on existing CCTV to TMC practices and recommendations on a new standard to distribute video.

Transportation Management Centers Streaming Video Sharing and Distribution, Michael L. Pack, Nikola Ivanov and Elizabeth Birriel, Federal Highway Administration, September 2019.
https://ops.fhwa.dot.gov/publications/fhwahop19037/fhwahop19037.pdf
This report discusses considerations and current management practices of sharing of traffic video streams with the public, media other agencies and other partners such as first responders and towing or recovery personnel. Recommendations are provided to assist TMCs in planning, implementing or improving video sharing. Discussion topics include:

- Why some agencies don't share videos. Reasons include cost, lack of technical capacity or outdated equipment, competing priorities or political and legal roadblocks (page 11 of the report, page 25 of the PDF).
- Operational considerations, including a public cutoff switch, separate feeds for different partners like first responders and whether to grant camera control to third parties (page 17 of the report, page 31 of the PDF).
- Institutional considerations like contracting and support requirements, legal implications and media or public relations (page 21 of the report, page 35 of the PDF).
- Technical considerations such as network and security requirements, "kill-switch" technology to avoid sharing inappropriate scenes, and technology and infrastructure maintenance (page 31 of the report, page 45 of the PDF).
- Highlights of state approaches to CCTV video stream sharing from Maryland, North Carolina and Virginia (page 59 of the report, page 73 of the PDF) and sample agreements (page 69 of the report, page 83 of the PDF).

Transportation Management Center Video Recording and Archiving Best General Practices, Stephen Kuciemba and Kathleen Swindler, Federal Highway Administration, March 2016.
https://ops.fhwa.dot.gov/publications/fhwahop16033/fhwahop16033.pdf
This report presents the state of the practice in state DOT CCTV video recording and sharing and general best practices covering technical, operational, policy and legal issues from information gathered from the literature, agency documents and 19 transportation agency responses to an online survey. Topics addressed include:

- Whether and how often to record video feeds (page 7 the report, page 21 of the PDF).
- Length of time recordings are kept (page 9 the report, page 23 of the PDF).
- Responding to requests for videos, including procedures, methods and staffing burden (page 15 of the report, page 29 of the PDF).
- Practices for sharing real-time video images, including constraints and risks, and sharing with law enforcement and security groups (page 23 of the report, page 37 of the PDF).

- Recording technology issues (page 29 of the report, page 43 of the PDF).

A video management system checklist beginning on page 35 of the report (page 49 of the PDF) contains considerations for cameras, network, storage and management of the video data. Other content related to legal or policy issues:

- FOIA (beginning on page 39 of the report, page 53 of the PDF), includes general requirements and discussion of state public records laws and privacy.
- Practices for written policies and agreements (beginning on page 45 of the report, page 59 of the PDF).
- Case studies: Iowa, Minnesota, New Jersey, Tennessee, Washington State and Wisconsin DOTs (beginning on page 53 of the report, page 67 of the PDF).
- Sample agreements and policies (beginning on page 70 of the report, page 84 of the PDF).

6.3 State Research and Resources

California

Automated Video Traffic Monitoring and Analysis, Preliminary Investigation, California Department of Transportation, August 2021.
https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/preliminary-investigations/pi-0289-a11y.pdf
This preliminary investigation reviewed state DOT use of automated video analysis for traffic monitoring and incident detection. Seven states responding to a survey indicated they have implemented, tested or plan to test automated video analytics software (Arizona, Arkansas, Delaware, Michigan, Minnesota, Oklahoma and Wisconsin). Respondents provided information on several topics related to managing video data:

- Video analytics software integration with traffic cameras.
- Case studies, including descriptions of communications network and system operation parameters.
- Agency experiences recording and archiving video.

Iowa

Road Authority Practices in Data Storage Survey, Heather McClintock, Max Perchanok, Paula Grcevic and Syed Salman, Iowa Department of Transportation (Aurora Program), June 2019.
https://intrans.iastate.edu/app/uploads/2019/06/road_authority_practices_in_data_storage_survey_w_cvr.pdf
This report summarizes a survey of U.S., Canadian and some European transportation agencies on their data collection and retention practices for RWIS, AVL, GPS, camera images and traffic data. A summary of information gathered regarding the storage of camera images begins on page 5 of the report (page 17 of the PDF).

Minnesota

Installing Snowplow Cameras and Integrating Images into MnDOT's Traveler Information System, Brian Hirt and Scott Petersen, Minnesota Department of Transportation, October 2017.
https://mdl.mndot.gov/_flysystem/fedora/2023-01/201741.pdf
From the abstract:

> In 2015 and 2016, the Minnesota Department of Transportation (MnDOT) installed network video dash- and ceiling-mounted cameras on 226 snowplows, approximately one-quarter of MnDOT's total snowplow fleet. The cameras were integrated with the onboard mobile data computer/automated vehicle location (MDC/AVL) equipment and automatically captured snapshots of road conditions during plowing. Images were sent to MnDOT's server and then imported in near-real-time to the MnDOT 511 website and MnDOT mobile app for use by the traveling public. This report details operational and technical considerations for various aspects of plow camera and 511 image integration deployment. It also includes perspectives from plow drivers, their supervisors, management in charge of deploying this project and members of the public. Project completion barriers, solutions and recommendations are included. Based on the successful deployment of this system, MnDOT recommends wider use of this equipment throughout MnDOT's snowplow fleet.

From the executive summary:

> After careful consideration of the capabilities and limitations of the cameras, the MDC/AVL system and MnDOT's back-end server, the following key operational features were ultimately selected and implemented:
>
> - The dash cameras automatically recorded images whenever the MDC/AVL system was on.
> - The cameras recorded an image of the road ahead of the plow.
> - Images were taken once every five minutes and were only retained if the plow was moving at least 10 mph.
> - The cameras were capable of taking operator-initiated snapshots and video clips.
> - Video clips could be classified into three categories: accident, general interest or work zone.

New Hampshire

Request for Logs/Video Transmissions, New Hampshire Department of Transportation, undated.
https://www.dot.nh.gov/sites/g/files/ehbemt811/files/inline-documents/request-for-video-form.doc
From the form: The Department of Transportation (DOT) with the assistance of the Office of Information Technology (OIT) procures, owns and operates full motion and static video images collection systems for the purpose of enhancing operations safety, security of facilities, transportation property and infrastructure. Use of video images provides a real time or an archival record of events to enhance system operations and security.

DOT requires that all persons requesting Log/Video Transmissions complete this form. The use of this form is to assist the DOT in responding to your request in the most timely and efficient manner possible.

The requesting party is hereby advised that the use of the requested video transmissions is limited to lawful purposes pursuant to RSA 236:130. Any person violating the provisions of that statute shall be guilty of a violation if a natural person, or guilty of a misdemeanor if any other person.

Washington

Department of Transportation Records Retention Schedule, Washington Secretary of State, April 2023. https://www2.sos.wa.gov/_assets/archives/recordsmanagement/department-of-transportation-records-retention-schedule-v.1.20-(april-2023).pdf
This document presents the records retention and disposition schedule for each office within Washington State DOT, including requirements related to video footage:

- **Transportation Operations**: Retain CCTV records/video until no longer needed for agency business (page 105).
- **Statewide Travel and Collision Data Office**: Retain video files of the state highway system for 20 years after the end of the calendar year; then transfer to the state archives for permanent retention (page 94).
- **Toll**:
  - *Digital Video Audit System*: Retain video for 90 days unless required for performance audit; then destroy (page 99).
  - *Video Surveillance System*: Retain video for 90 days unless required for security review, then destroy (page 101).

Tips and Techniques Best Practices from the Literature

The literature offers a number of best practices for the capture, storage and management of transportation-related videos and images. Many of the best practices below are informed by the 2016 Federal Highway Administration report *Transportation Management Center Video Recording and Archiving Best General Practices* cited on page 30 of this synthesis report:

- For video requests, implement efficient processes such as the integration of a web-based request form to a database for tracking requests and reducing manual data entry.
- Use a consistent and searchable file naming system to reduce future search times.
- Consider incorporating law enforcement personnel into video searching capabilities, as law enforcement represents a large share of video requests.
- To lower storage costs, use a higher resolution for live viewing and a lower resolution for recording.
- To ensure integrity for legal use, consult with law enforcement, follow standard processes, and limit the number of staff that have access and fulfill requests.
- Maintain the ability to cut video feeds from public view in sensitive situations while preserving them for agency and emergency responder use.
- Work with agency counsel or FOIA officers to ensure records retention and access requirements are met when sharing video or image data.
- Work with IT departments to ensure technical needs are met for managing video or image data, including integration into other agency systems.

Appendix A: Survey Questions

The survey questions below were provided in an online format to member states of the Clear Roads pooled fund, the No Boundaries Transportation Maintenance Innovation pooled fund, and members of the Snow and Ice List-Serv.

(Required) Does your agency record transportation-related videos and/or images obtained from on-board cameras on snowplows and other heavy equipment?

- Yes (Skipped the respondent to **Collecting, Storing and Sharing Video Recordings and Images** and the remaining questions, if applicable.)
- No (Skipped the respondent to **Wrap-Up**.)

Collecting, Storing and Sharing Video Recordings and Images

1. Please indicate below the sources of videos and images your agency records and saves for some period of time. Please select all that apply.
    - 511 cameras
    - Drones
    - Snowplow forward-facing cameras
    - Snowplow driver-facing cameras
    - Snowplow rear cameras
    - Safety Service Patrol forward-facing cameras
    - Safety Service Patrol driver-facing cameras
    - Safety Service Patrol rear cameras
    - Other vehicle forward-facing cameras
    - Other driver-facing cameras
    - Other vehicle rear cameras
    - Other (Please describe.)
2. Please identify below the types of video recordings and images that are stored in each storage medium below.

    On-board storage:
    On-premises server:
    Cloud-based storage with a third party:
    Memory card:
    Other (Please describe.)
3. How does your agency employ the video recordings and images it collects for internal use? Please select all that apply.
    - Emergency operations
    - Marketing and communications
    - Online training materials
    - Personnel discipline
    - Platforms that interpret road conditions
    - Responding to citizen complaints
    - Security
    - Social media
    - Traffic analytics
    - Winter maintenance level of service

- Winter maintenance performance measurement
- Other (Please describe.)

4. Is your agency sharing live video from a snowplow or other vehicle with the public?
   - No
   - Yes (Please describe when and how this is done.)
5. Has your agency attempted to prevent outside entities from "scraping" public-facing video?
   - No
   - Yes (Please describe these efforts.)
6. Are your agency's transportation-related video recordings and images shared with federal, state or local government agencies?
   - No
   - Yes (Please provide a few examples of your agency sharing video recordings and images.)
7. Are the video recordings and images shared with researchers funded by your agency?
   - No
   - Yes (Please describe the type of research that might benefit from the video recordings and images your agency collects and stores.)
8. Does your agency include nondisclosure language in contracts or agreements, or employ a similar practice, that limits or precludes the sharing of transportation-related videos and images with other parties?
   - No
   - Yes (Please describe your agency's nondisclosure language or similar practice that addresses the sharing of transportation-related videos and images with other parties.)
9. Please describe any best practices your agency has identified with regard to collecting, storing and sharing video recordings and images.

Retention Policies and Practices

1. Does your agency have a formal policy regarding the retention of transportation-related video recordings and images?
   - No
   - Yes (Please provide a link to your agency policy or send an electronic file to dan.kleinmaier@ctcandassociates.com. If you're unable to share a published policy, please briefly describe it below.)
2. Are there certain types of transportation-related video recordings and images that are subject to retention periods that are different from other types of videos or images? For example, some agencies retain video recordings of accidents for a longer period of time.
   - No
   - Yes (Please describe how retention periods differ by video recording or image type.)
3. Please indicate the period of time video recordings and images are retained as dictated by policy or as common practice.

   Policy requirement:
   Common practice:
4. Can your agency obtain video recordings and images from your vendor if they are not available in your agency repository?
   - Not applicable
   - No
   - Yes (Please describe how far back your vendor's access to these files goes.)

5. Has your agency identified any retention-related issues that are associated with the increasing number of video recordings and images being captured and retained by transportation agencies?
    - No
    - Yes (Please describe these issues.)
6. Please indicate the importance of the factors below when establishing a retention period for video recordings and images using the rating scale of 5 = extremely important to 1 = not at all important.
    - Cost of storage
    - Federal law
    - State law
    - Freedom of Information Act (FOIA) or other open records requests
    - Internal records disposition schedules
    - Marketing
    - Social media
    - Statewide records disposition schedules
    - Usefulness for law enforcement or legal investigations
    - Usefulness to internal agency operations
    - Usefulness to research
    - Other (Please describe.)
7. Please describe any best practices your agency has identified regarding the retention of video recordings and images.

(Required) 8. Does your state have statutory or administrative requirements for the retention of video recordings and images by transportation agencies?

- Yes (Skipped the respondent to **Statutory or Administrative Retention Requirements** and the remaining questions.)
- No (Skipped the respondent to **Responding to Records Requests**.)

Statutory or Administrative Retention Requirements

1. Please briefly describe the state's requirements for the retention of video recordings and images captured by transportation agencies.
2. Please provide below a citation or link to the relevant statute and/or administrative code.

Responding to Records Requests

1. Please describe your agency's requirements for responding to public requests for video recordings and images.
2. Does your agency assess a fee for providing these video recordings and images?
    - No
    - Yes (Please describe the fees your agency assesses.)
3. Are portions of the videos or images redacted to address privacy concerns?
    - No
    - Yes (Please describe this practice and who is responsible for it.)
4. Does your agency have policies related to the use of agency video recordings and images by third parties without a specific request? For example, is a third party permitted to "grab" an agency recording or image online and post it to social media?
    - No
    - Yes (Please describe these policies.)

5. Please share best practices your agency has identified for providing video recordings and images to the public or media upon request.

Wrap-Up

Please use this space to provide any comments or additional information about your previous responses.

research for winter highway maintenance

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Research Services
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