A317a: Understanding User Needs for CCTV Systems Stations Based on NTCIP 1205 Standard

Table of Contents

Module Description

The purpose of this module is to teach the students how to identify and write user needs specific to the NTCIP 1205 v01 CCTV Standard, which does not currently contain user needs and requirements. The focus of this module is to assist technical staff in developing a set of user needs that meet operational needs to support traffic management and traveler information service functions.

This module explains the scope of the CCTV Standard and details available to users. It provides information helpful in identifying the uses and associated operational needs of CCTV systems. This module is to be placed in the context of the SEP as well as in the acquisition curriculum path with I101, A101, A102, A201, and A202 modules being the prerequisites.

This module builds on A202: Identifying and Writing User Needs When ITS Standards Do Not Have SEP Content, which defined user need extraction process and techniques linked to the NTCIP 1205 v01 Standard and acquire a CCTV system based on what the user is seeking to accomplish with support from tools and resources such as an MIB and conformance groups and statement.

1. Introduction to CCTV System and User Needs

Close Circuit Television (CCTV) System or CCTV System

A **System** is a collection of components organized to accomplish a specific function or set of functions. In the ITS standards deployments, we deal with systems or subsystems which consist of multiple field devices. CCTV system is one of the most widely used ITS subsystems.

The term CCTV has a specific meaning; CCTV images remains within the circuit, unlike the broadcast TV images which can be seen by anyone. The CCTV system consists of multiple cameras installed on a transportation facility to provide "images" in near real-time and includes monitors and camera control unit. Additional parts are added as needed to share video and record images for later uses. The CCTV systems in many variations are used in a major way in both the security industry to protect property and people, and in transportation-ITS deployments for managing networks and services in real-time. Thus a CCTV system can be termed as a safety and security tool.

Virginia Department of Transportation's (VDOT) definition for its CCTV system:

The "CCTV system," for the purposes of (VDOT document), is defined as the use of VDOT owned and operated video cameras located along VDOT and associated County assets in the NRO region for traffic surveillance, congestion monitoring, incident verification, and public/media information. The CCTV system includes the CCTV cameras, communication infrastructure, and the variety of output sources (Ref.8).

The CCTV system provides versatile real-time visual information to the TMC operators. Acting as eyes in the field, the system aids TMC operators in quickly and effectively identifying and responding to incidents, events, and maintenance needs. A CCTV camera is typically equipped with pan-tilt-zoom capabilities to allow the operator to adjust the view and observe specific areas. The information obtained from the video provides confirmation of traffic incidents, event, weather conditions, and emergency issues. The CCTV camera system also provides video distribution for public and media use (Ref.8).

Specific Uses of a CCTV System in Transportation Sector

- Verify the existence of a reported congestion condition
- Verify incident detection
- Verify a message on a DMS sign
- Monitor evacuation route and route diversion
- Monitor a large parking lot for opened slots availability
- Monitor facilities during special events or an emergency

Understanding Permissible Use of Video Feeds Made available by the TMC

Examples (Based on Arizona Department of Transportation)

- The CCTV system is primarily used by the transportation agencies for incident verification, traffic monitoring, event management, and other transportation management related functions. Examples of acceptable transportation operations use include verification of the status of a traffic signal using a camera and viewing the on-going maintenance activities being performed on a roadway.

- The CCTV camera images or feeds are not to be recorded, unless written permission is granted by the owning agency. Agencies that allow release of video or images to the public should be aware that these feeds can and may be recorded once released.

- CCTV cameras are not to be used for collection of personal information or surveillance of private property, vehicle license plates, or individuals. Operators are not authorized to zoom in on details such as license plates and individuals.

How does NTCIP use a CCTV System?

The NTCIP communications layout shown in Figure 1 shows how a central management station to communicate to the field cameras in real-time and control device for multiple uses.

- CCTV operations are carried out with SNMP as a primary protocol.
- Camera device vendors supply both Central management station-based SNMP Manager and Agent (both are software modules) to work with the CCTV MIB, or device objects. This is done in the firmware of the camera unit (This may also include processing at the source of image production).

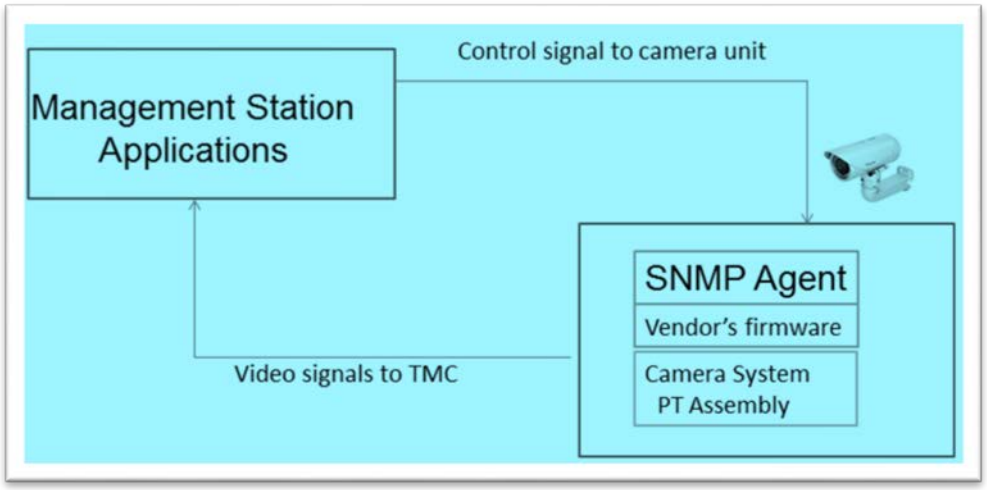

Figure 1: CCTV System Communications Interface

CCTV System Operations

Typically three operations are used in a CCTV system:

- CCTV Device Control Functions
- Modifications of Functions (altering behavior) of a Camera Unit
- Data Retrieval (current conditions data-monitoring) from the Camera Unit

These operations are carried out by SNMP messages; SET and GET. This will be discussed in the next Module A317b – Understanding Requirements for CCTV Systems Based on NTCIP 1205 Standard.

National Transportation Communications for Intelligent Transportation System Protocol (NTCIP)

The NTCIP is a framework of a family of standards which serves two categories of needs: center to field communications for devices and center to center communications for information exchange among centers. The NTCIP framework uses SNMP as a communications protocol, which controls a device indirectly (implicitly using commands (GET, SET).

Management System (Station)/SNMP Agent Model

A management station is a computer or computer network that houses an SNMP Manager which interacts with the device via the defined interface to realize the features of the device, such as a

Traffic Management System referenced in NTCIP device standards. The SNMP Agent is a software module that resides in a device firmware and interfaces with both the device and the central SNMP manager. CCTV system works as a Manager/Agent model.

Objects and Management Information Base (MIB)

A MIB is a set of device object definitions or data elements. The object has a definite structure provided by the format called Abstract Syntax Notation 1 (ASN.1), which is an international standard for defining objects.

An object defines the attributes, properties, and controllable features of the devices on a network. The device is remotely monitored, configured, and controlled by manipulating the content of an object that defines a function. The following is an example of a CCTV system object for presets.

Maximum Number of Presets Parameter

rangeMaximumPreset OBJECT-TYPE
SYNTAX INTEGER (0..255)
ACCESS read-only
STATUS mandatory
DESCRIPTION "A preset is the pre-specified position where a camera is pointed to a fixed point in space (includes positions for pan, tilt, and zoom). The maximumPreset is a number indicating the total number of possible preset positions supported by the device. A value of zero (0) identifies that the device does not support presets."
::= { cctvRange 1 }

The above example of a CCTV system object structure details include a unique name-rangemaximumPreset; the syntax field which provides value-how many presets (should be more than 1, less than 255 but 0 will not deliver preset capability), this is a Mandatory-required object and it can only be read. The description explains what it will do for system and last line shows Object's unique identification-location in the MIB tree-under which node it can be found). We are able to infer from this detail of the object-namely N number of presets are to be provided by the system. For example, a large size TMC Freeway management operation may select 50 presets, while a simple operation may just have 5 presets for operation.

2. User Needs and Related Operational Considerations

IEEE standard 1362 defines user need as: "a *user requirement for a system that a user believes would solve a problem experienced by the user*." *(Note: the use of word requirement here does not imply system requirements)*

The NTCIP family of device standards refers to user need as "*The business or operational problem (opportunity) that must be fulfilled in order to justify purchase or use."* While this is termed a "user need' within the NTCIP community, it reflects needs of all stakeholders."

By establishing user needs, users declare what they want from the intended system and system must satisfy stated user needs. If this step is not taken carefully, the outcome could be an incomplete system and a non-interoperable system may result. To avert such adverse outcomes, we must ensure that user needs for all concerned ITS standards are identified and properly written in the specification.

The user needs identified in the NTCIP device standards do not reflect all the possible user needs that may be desired for that device. The user needs listed only reflect those features that are commonly desired by stakeholders and thus are supported by the device standard. Each procuring agency may have additional user needs not identified by the standard, and those user needs will have to be expressed in the procurement specification.

Operational environment – The operational environment defines how data may be exchanged across the communications interface.

Features – The features identify and describe the various functions that users may want the device to perform. These features are derived from the high level user needs identified in the problem statement but are refined and organized into a more manageable structure that form the basis of the traceability tools. The operational environment and features are collectively called the user needs.

How User Needs affect Interoperability

Off-the-shelf interoperability and interchangeability can only be obtained by using well documented user needs, along with their corresponding requirements and design that are broadly supported by the industry as a whole. Designing a system that uses environments or features not defined in a standard or not typically deployed in combination with one another will inhibit the goals of interoperability and interchangeability, especially if the documentation of these user needs is not available for distribution to system integrators. The standards allow implementations to support additional user needs in order to support innovation, which is constantly needed within the industry; but users should be aware of the risks involved with using such environments or features.

For an agency to achieve interoperability and interchangeability, procurement must ensure that a careful assessment of user needs is done and common set of needs are established as a first step. By defining the meaning of the words in the common language (dictionary) and their effect upon advice (functionality), the NTCIP standards such as NTCIP 1205 achieve interchangeability. The standards establish a minimum level of common functionally. While a system and its components are free to go beyond the common functionality, subscribing to the NTCIP standards ensures that a level of interchangeability is always present.

For example, user needs shown here state that a TMC desires to exchange messages with other centers. Without this user need written in the specification, system developers will be unaware of the users' intentions and underlying operational needs. That will be a problem to correct later on. The user needs are central to system development and if these are missed or the designer misrepresented the user needs, incomplete or non-interoperable systems could result.

What is important is that the agency personnel understand what they want their devices and systems to do for them because that will provide input to the application of the mixed standards for their procurement process.

User Needs Dictate Features

A feature is a behavior of the device. A device has more than one feature to serve desired (assigned) functions. The features identify and describe the various functions that users may want the device to perform. These features are derived from the high level user needs identified in the problem statement but are refined and organized into a more manageable structure that forms the basis of the traceability table; the Protocol Requirements List (PRL).

User Needs Affect Interchangeability (Vendor-independence)

A condition which exists when two or more items possess such functional and physical characteristics as to be equivalent in performance and durability, and are capable of being exchanged one for the other without alteration of the items themselves, or adjoining items, except for adjustment, and without selection for fit and performance. (National Telecommunications and Information Administration, U.S. Department of Commerce)

According to the NTCIP Guide, *interchangeability reflects the capability to exchange devices of the same type on the same* ***communications channel*** *and have those devices interact with others devices of the same type using standards-based functions. With interchangeability, system components can be changed out (switched) with similar components from different vendors because they possess common functional and physical characteristics. An example of interchangeability is signal controllers from different manufacturers interacting with each other to provide traffic signal coordination along an arterial throughway.*

Operational Considerations Related to CCTV System User Needs

(Ref. Author: Paul Olson, FHWA Resource Center)

System Users

- Why do you need video images? What is the problem you are trying to solve? What is the service you intend to provide? Prepare a written narrative describing this.
- Who are the intended users of the CCTV images? Are all of the users REQUIRED users? Are some optional? Provide a list.
- What are the uses of the CCTV images? Are all of the uses REQUIRED functions? Are some optional? Provide a list.

- What users will have access to which system features? Prepare a matrix detailing who has access to which features.
- Who will have access to view the images at the completion of this project? Are the stakeholders identified in the Regional Architecture? Provide a list of who will have access. Later in the process you should assign particular rights and profiles to each of these users.
- Might one of the system users be emergency medical response sending images and medical information to the ER? If so any cameras might be installed in a responder's helmet. The images and data may have quite different and unique requirements.
- Consider that some of the consumers of video information may be mobile. For example, there may be a need to send video to a mobile terminal in a police car or even a maintenance worker with a wireless PDA.

Camera Control

- Who will have access to the camera pan, tilt, and zoom controls?
- Who will have rights to override others and what will be the hierarchy or who can wrest pan, tilt, and zoom control from another operator and under what conditions?
- Then if a higher priority operator does wrest control does that control have to be actively handed/taken back or would it automatically revert after a specified period of time. Consider what may happen if manual hand offs is required and an operator who has not manually released control then goes home or even worse goes on a two-week vacation.
- If user priority were assigned for a fixed/variable length of time would there be a notification when this time expires? Would this notification go only to the user whose priority is expiring or to all users? Would this notification take place at the exact time or expiration or some user defined time prior to expiration?
- Could the user determine/set the length of time that they would retain priority control? Would all users be able to do this?
- Describe actions needed to relinquish control rights. Different users may have different methods assigned.
- If an operator does wish to take control of a camera would the other operator(s) be notified who has taken control?
- If the camera is fixed so that the view can't be changed should the operators be shown this? In other words, no camera control parameters would be offered to the operator. One example would be a camera that serves first for vehicle detection and second for roadway surveillance.
- If the cameras' primary role were video detection or some other sensing task would operators at remote facilities need to reprogram the detection/sensing zones or functions? Who would be allowed to do this? How might this work? Since this may be part of an operating traffic signal what type of security and constraints might apply?
- Will there be preset[1] camera orientations? If so how many?
    - Could the system administrator predetermine the pre-sets?
    - Can the user set personal presets individually? Would all users be able to define personal presets?
    - Could some users be able to set presets on some cameras but not others?

[1] A pre-specified position where a camera is pointed to a fixed point in space. A preset includes pan, tilt, and zoom parameters. Presets are typically programmed by manually adjusting the camera position and lens zoom setting followed by initiating a save command from the camera control system. Source: *NTCIP 1205.*

  - Can different users have different individualized suites of presets?
  - Will each user be allowed the same number of pre-sets?
  - Are all pre-sets permanent? Could they be tagged with expiration dates/times or until the user signs out? Would the user be notified of a pending pre-set expiration?
  - Would the system automatically blank images from being sent if that image is positioned to another preset that that particular operator is not allowed to view?
  - Would it then give that operator a message telling them that they are not allowed to view that preset?
- Can presets be grouped into "supersets" that might be associated with specific situation or operational mode? Would these supersets as well as any other presets be automatically restored?
  - How many "supersets" per user?
  - Could a user switch them in groups?
  - Would the administrator set them or could individual operators set them?
  - Would they be volatile or non-volatile?
  - Would the superset also include automatic timeouts or would they be discretionary and associated with each use or both?
- Can particular camera views be blocked or the image is degraded if a particular operator isn't allowed to view the scene? The camera could still be moved thru that zone. Think of "privacy zones."
- Would the ability to control a camera be related to a specific facility, agency, or situation? This leads to the definition of an arbitration mechanism? Note that many installations use the simple priority of internal first and external second—and last person wins in a control contest. While on the surface this seems harsh—in practice, within a single facility, the operators cooperate and conflicts are rare.
- Can the cameras be controlled via a graphical user interface and a physical joystick mechanism? Could this be interchangeable and done on the fly?
- Is the speed at which the camera is moved or adjusted important? Determine the performance criteria that must be met?
- Must the system accommodate equipment from multiple vendors? This could include cameras, pan tilt units, zoom lens, and more. This may require support of multiple control protocols.
- Prepare a matrix of which users can access which features and functions. Develop a mechanism to manage this matrix as the system grows and changes.

Camera Tours Operational Issues

- Will the system have to provide a series of preset scenes commonly called tours? If so how many?
- Could there be different tours for different users? How will this arbitration be handled?
- Would there be operator controlled overrides on these tours such as pause, stop, forward, reverse? Would they be global or on an individual basis?
- Could there be "situational determined" tours which could be launched by a single command?
- Will the system need to send a preset sequencing of images to a selected source(s)?
- Would the system automatically blank images from being sent if that image is positioned to another preset or move the camera to the preselected preset and would it automatically reset it back to the previous position?

- How should it respond in the event the particular camera is actively moving or has been locked out or positioned to another scene by another higher priority user?
- How will this avoid bouncing the cameras back and forth?

3. Criteria for Writing CCTV User Needs

Why are we Writing CCTV System User Needs?

A procurement writer is required to develop a specification to acquire a standards-based system by deriving user needs from standards. The problem occurs when a project needs to deploy standards without SEP content. These standards do not contain documented user needs from which an agency can select or customize. There are several such standards (both devices and systems) developed. For example both the traffic controller and CCTV standards do not contain user needs listing.

As stated earlier, a user need describes a business or operational problem (opportunity) that must be fulfilled in order to justify purchase or use. This representation may occur in many ways expressed by different users with varied understanding of the baseline case. This could lead to an incomplete system development or ambiguous statements confusing developers. To avoid such happenings, users must understand how to write user needs and put them in proper context and meaning of desired interoperability and/or need for vendor independence.

Criteria for Writing a Well-formed User Need

In general, ITS Standards with SEP content have followed the following SE criteria to define user needs and we need to understand this and apply to user needs extracted from standards without SEP content.

1. **Uniquely Identifiable**: Each need must be uniquely identified (i.e., each need shall be assigned a unique number and title).
2. **Major Desired Capability** (MDC): Each need shall express a major desired capability in the system, regardless of whether the capability exists in the current system or situation or is a gap.
3. **Solution Free**: Each need shall be solution free, thus giving designers flexibility and latitude to produce the best feasible solution.
4. **Capture Rationale:** Each need shall capture the rationale or intent as to why the capability is needed in the system.

The above criterion is used in the process of extracting and writing a user needs from the standards without SEP content as discussed in the next section.

4. NTCIP 1205 CCTV Conformance Groups

A conformance group is defined as a basic unit of conformance (NTCIP standard) and contains both mandatory and optional objects. Each NTCIP device standard completed without SEP content has a section on conformance groups. **A Conformance Statement** (in the form of a Table) lists required conformance groups to comply with subject device standard. Please note that NTCIP 1201 Global Objects (GO) is recently updated (Users are advised to use updated standards).

Table 4-2: Conformance Statement Table

CONFORMANCE GROUP	REFERENCE	CONFORMANCE REQUIREMENT
Configuration	NTCIP 1201:1996	mandatory
Database Management	NTCIP 1201:1996, Amendment 1	optional
Time Management	NTCIP 1201:1996, Amendment 1	optional
CCTV Configuration	NTCIP 1205	mandatory
Extended Functions	NTCIP 1205	optional
Motion Control	NTCIP 1205	optional
On-Screen Menu Control	NTCIP 1205	optional

Example: Motion Control Conformance Group (Section 4.1.3)

Example of the Motion Control lists required objects-mandatory. The conformance requirement for each object within this CG is shown.

The Motion Control Conformance Group ***shall consist*** of the following objects:

presetGotoPosition	NTCIP 1205	mandatory
presetStorePosition	NTCIP 1205	mandatory
positionPan	NTCIP 1205	mandatory
positionTilt	NTCIP 1205	mandatory
positionZoomLens	NTCIP 1205	mandatory
positionFocusLens	NTCIP 1205	mandatory
positionIrisLens	NTCIP 1205	mandatory

Extracting CCTV User Need from the NTCIP 1205 Standard

Step-1: Read: Those Standards without SEP content do have MIB and Conformance groups listed in documentation. They represent “functions” or user needs that are served by functions. (In this example, go to NTCIP 1205 CCTV and check the details).

Step-2: Recognize: CG have collection of objects, contained in MIB, match them to what you are looking for or purpose they serve. [Go to CG Table 4.2]

Step-3: Infer: Infer from CG Motion Control with MIB objects, a need to control pre-sets, also know that mandatory CG must be selected so, UN will be mandatory. The capacity (how many pre-sets you need) is controlled by a range in the Object definition (see below). User desiring interoperability will have to select same range support at minimum. Description of an object also aids in the process.

Maximum Number of Presets Parameter

rangeMaximumPreset OBJECT-TYPE
SYNTAX INTEGER (0..255)
ACCESS read-only
STATUS mandatory
DESCRIPTION "A preset is the pre-specified position where a camera is pointed to a fixed point in space (includes positions for pan, tilt, and zoom). The rangeMaximumPreset is a number indicating the total number of possible preset positions supported by the device. A value of zero (0) identifies that the device does not support presets."
::= { cctvRange 1}

User Need ID	User Need Title	User Need
UN 1.0	Need to control a remote CCTV device to view traffic conditions for congestion management and events in the TMC region	
UN 1.1	*Need to Control a Remote CCTV Device*	A center needs to remotely pre-set control pan/tilt/zoom
UN 1.2	*Need to Configure a Remote CCTV Device*	A center needs to remotely set up to five pre-set positions

Note: Each non-SEP standard may require you to inferring multiple CGs and MIB objects.

Step-4: **Write:** Give a unique ID and title [write criteria state that UN must be uniquely identifiable]; there is a rationale to provide for use of camera to monitor conditions an operational need UN 1.0, and a major desired capacity, to control CCTV (UN 1.1).

Using the above steps (READ-RECOGNIZE-INFER-WRITE) and prescribed **Criteria** discussed above a set of user needs are organized.

Validate CCTV User Needs

Traceability
Each user need shall be traced to one or more functional requirements and each functional requirement shall be derived from at least one user need. This traceability is shown in the PRL for SEP based device standards, in conformance groups in standards without SEP content and in NRTM (Needs to Requirements Traceability Matrix) in system standards. Each user need shall be

traced to one or more functional requirements and each functional requirement shall be derived from at least one user need. This traceability is shown in the PRL for SEP based device standards, in conformance groups in standards without SEP content and in NRTM (Needs to Requirements Traceability Matrix) in system standards.

5. Video Formats

Video format and related standards deal with conversion, storage and compression techniques used for transmission of images. These standards are outside of the transportation domain or ITS or NTCIP activities. They are developed and used by the Internet community for video-audio and data transmission. Some related information is stated below:

- Analog video requires large amount of bandwidth-capacity. Camera produces analog signal, which is often converted by a decoder device for mixing with other control-record devices. Decoders are not standardized. Legacy CCTV systems in TMCs do use analog cameras and they do provide full motion video.
- Digital video requires that the analog video source be converted to digital "data" to use the network controls. Modern cameras all Dome Type-IP cameras and images are captured as "solid state"-digital form at source.
- Coder-decoder (CODEC) converts to digital and compresses signals

NTCIP 1205 standard does NOT cover these formats but they are presented here for awareness purpose:

- **National Television System Committee** (NTSC) is the video system or standard used in North America and most of South America. In NTSC, 30 frames are transmitted each second. Each frame is made up of 525 individual scan lines. [NTSC is used in the US]
- **Phase Alternating Line** (PAL) is the predominant video system or standard mostly used overseas. In PAL, 25 frames are transmitted each second. Each frame is made up of 625 individual scan lines.
- **H.261: Video conferencing/H.264: High definitions** (Latest standard in use)
- **JPEG (Joint Photographic Group Experts):storing images, M-JPEG is for motion where an image is compressed independently**

- **MPEG-2/4 (Moving Picture Experts Group): motion picture**

  MPEG-2, the standard for broadcast television and DVD's, provides full NTSC or PAL resolution (30-25 lines per sec) and is practically indistinguishable from uncompressed video. Intelligent transportation systems have largely standardized on MPEG-2 transmitted via Transport Streams. ITS systems have fully embraced the Internet Protocol – allowing high quality MPEG-2 and MPEG-4 video to be reliably delivered from hundreds of locations to multiple monitoring locations.

- **Open Network Video Interface Forum (ONVIF)**-IP Cameras on the Internet. ONVIF is an open industry forum for the development of a global standard for the interface of IP-based physical security products. The ONVIF specification defines a common protocol for the exchange of information between network video devices including automatic device discovery, video streaming and intelligence metadata. The key concept is the interoperability. [Module A317b-CCTV Requirements will cover video formats details].

5. Glossary [These terms are linked to user needs]

- **Iris**: The amount of light transmitted through a lens is controlled by an adjustable diaphragm, or iris, located in the lens barrel. The opening is referred to as the aperture, and the size of the aperture is controlled by rotating the aperture control ring on the lens barrel.

- **Resolution**: A measure of the ability of a camera or television system to reproduce detail. That is the number of picture elements that can be reproduced with good definition; it is a factor of the pickup device or the TV CRT characteristics and the video signal bandwidth.

- **Presets:** A pre-specified position where a camera is pointed to a fixed point in space. A preset includes pan, tilt, and zoom parameters. Presets are typically programmed by manually adjusting the camera position and lens zoom setting followed by initiating a save command from the camera control system.

- **Zone:** a region in space defined by pan and tilt limits. A zone is typically identified by a pre-programmed text message that is displayed to the user when the center of the camera's field of view is within the zone. This standard allows for the establishment of user definable zones. A zone is a region in space that is defined by the pan and tilt limits of the device. As the device moves, zones may be encountered.

- **Camera Tours:** a series of presets which will provide continuous coverage.

- **Focus:** The process of sharpening a blurred image on a screen, monitor, or any display; adjusting picture to achieve the greatest possible resolution.

- **Heater:** A device used to maintain a constant camera enclosure temperature. A heater is typically thermostatically controlled and is used in harsh viewing environments.

- **Home position:** An arbitrary pan, tilt, and zoom position is defined by the camera vendor. The home position represents a mechanical reference point from which camera and lens position parameters are measured.

6. References

1. NTCIP Guide, Information Report 9001, http://www.ntcip.org/library/

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9. *Testing For Compliance To NTCIP Standards, Texas Transportation Institute, 2007*
   [This report contains certain CCTV user needs listing]
   http://tti.tamu.edu/document/0-5003-2.pdf

10. National ITS Architecture v7.0, 2012
    http://www.iteris.com/itsarch/index.htm

11. USDOT, RITA, ITS- JPO, http://www.its.dot.gov/index.htm (Fact sheets)

12. USDOT, FHWA, Operations, http://ops.fhwa.dot.gov

13. USDOT Standards Program, http://www.standards.its.dot.gov

7. Study Questions

Question 1: Which of the following applies to the NTCIP 1205 standard?

Answer choices

a) Supports video signal compressions formats
b) Provides CCTV system design objects
c) Provides documented CCTV user needs
d) Provides documented CCTV requirements

Question 2: Which of the following is <u>NOT</u> a true statement related to traffic management?

Answer choices

a) TMC typically performs assessment of traffic conditions.
b) TMC typically gathers detailed information during an accident.
c) TMC does not share camera images with the public either indirectly or through travel information.
d) Operational needs are part of the ConOps.

Question 3: The NTCIP 1205 CCTV standard does not provide the documented user needs for the acquisition process.
What is the Best Source of User Needs?

Answer choices

a) Traffic Management Concept of Operations
b) Regional ITS Architecture
c) Standard Documentation (Structure of standard)
d) All of the above sources

Question 4: Which of the following is a well-formed CCTV user need?

Answer choices

a) The TMC operator has a need for 64 presets.
b) The CCTV system must allow for 0-360 degree Panning.
c) The CCTV system must provide for up to 100 labels.
d) The TMC operator has a need for monitoring current value of the temperature in the camera enclosure for proper operation.

Question 5: Which of the following is NOT a true statement related to the NTCIP 1205 CCTV standard?

Answer choices

a) Supports video formats.
b) All mandatory CGs must be selected for conformance.
c) Extended Functions Conformance Group allows for On-Off of devices remotely.
d) Supports Pan-Tilt-Zoom (PTZ) capability for remote control operation.