

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
<p>Instructions for completing the Compliance Matrix: The following table shall be filled in by the Smartlink bidder indicating their compliance with the requirements listed. If the proposed system does not meet a specific requirement, the bidder has the option to suggest a rewording of the requirement that they can meet or to note that they will request a waiver from meeting that particular requirement.</p>					
AM001	Smartlink shall provide software tools that facilitate the installation, configuration and set up of the system.	1			
AM001G	An operator with appropriate permissions shall be able to create temporary zones on their workstation to use to disable/enable alarms.	2			
AM001G1	The temporary zone shall only exist during the session in which the operator created it and is removed when the operator logs off.	2			
AM001H	Smartlink shall have a permission field (per user) for typing a manual message for a HAR device.	1			
AM001W	An administrative application shall be provided to set-up user accounts for the Smartlink Secure web page application.	1			
AM002	Smartlink shall provide software that facilitates the entry and editing of ITS Device information.	1			
AM002G	The system administration function shall support the creation of DMS groups consisting of two or more DMS signs and naming the groups.	2			
AM003	An administrative application shall be provided to set-up operator accounts for the Smartlink.	1			
AM004	An administrative application shall be provided to allow administrators to add and remove vehicles from the AVL tracking system.	3			
AM005	An administrative application shall be provided to allow administrators to create, delete and edit alarm zones that are used to selectively suppress alerts and alarms for operator selected zones applicable to their workstation.	2			

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AM006	The Smartlink system administrative function shall provide the ability to create, delete and edit lists of personnel and contact numbers as well as a catalog of agency resources that can be used to help manage an incident based on incident type and location.	1			
CC001	Smartlink shall provide data to other centers through a center-to-center interface.	1			
CC001C	Smartlink shall be able to command other Smartlink site's ITS devices through the C2C subsystem.	1			
CC002	Smartlink shall be able to command and control other Smartlink sites through the Center-to-Center communications subsystem.	1			
CC002C	Smartlink shall be able to access other Smartlink sites' data using the center-to-center interface.	3			
CC003	Smartlink shall make available a Direct Information Feed for third parties using the center-to-center interface to external users.	1			
CC003S	The Direct Information Feed for third parties shall be split into a data stream for NCDOT data and a data stream from non-NCDOT sources.	1			
CC004	Smartlink data available via the center-to-center interface shall be time stamped.	1			
CC005	Smartlink calculated performance measures shall be accessible through the Center-to-Center interface.	3			

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CC006	Smartlink shall adhere to a detailed Interface Control Documentation of the Center-to-Center communications link so that it and others may implement the interface and communicate with Smartlink.	1			
CT001	At a minimum, the CCTV function shall provide device drivers for the following camera type: NTCIP compliant cameras.	1			
CT001C	A scheduler function shall be provided that allows for sequence definitions that contain information needed to run a sequence on a particular CCTV camera.	3			
CT001C1	The scheduler function shall allow a sequence to be created for presets containing at a minimum; one or more preset numbers and duration (dwell time) for each preset.	3			
CT001C2	The scheduler function shall allow a sequence to be created for camera control containing at a minimum; pan speed and direction and/or tilt speed and direction and/or zoom factor.	3			
CT001C3	Once a schedule is created, a summary of the schedule shall be able to be viewed and printed.	3			
CT001C4	It shall be possible to create a schedule of presets with a repeat attribute selected and a dwell time resulting in the camera(s) being moved to the appropriate preset position every time the dwell time expired.	3			
CT001D	The camera drivers shall be capable of controlling pan/tilt/zoom (PTZ) camera systems deployed by NCDOT.	1			

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CT001D1	The camera drivers shall be capable of interfacing with the Pelco 9760 switch that operates with the System manager 9700 software.	1			
CT001D2	The camera drivers shall be capable of interfacing video switches used in a network where switches are nodes in the network.	1			
CT001G	An operator with appropriate permissions for the CCTV subsystem shall be able to designate a color for the CCTV icon when it is associated with a schedule.	3			
CT001L	The CCTV camera lock function shall be able to be overridden by an operator who has permission to override a camera lock.	1			
CT001T	The CCTV tour function shall allow an operator with appropriate permissions to select one or more video sources under Smartlink control and route that video to a specific video output of a video switch that is under Smartlink control.	1			
CT002	The CCTV function shall incorporate software logic to allow only one workstation at a time to control a particular CCTV camera by locking it to one operator's station.	1			
CT002C	Schedules shall contain information needed to allow a sequence to be run at specified times in the future.	3			
CT002C1	Schedules shall contain one or more sequences, a start and end time for each sequence that includes specific days of the week and an associated camera or cameras.	3			
CT002C2	Schedules can be activated or deactivated by an operator with appropriate permissions.	3			
CT002C3	The schedule shall be able to be specified and created by calendar dates.	3			

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CT002D	The NTCIP protocol standard used to control cameras shall be NTCIP 1205:2001 version v01.08, December 2001.	1			
CT002G	The CCTV control function shall display a static daylight scene of where the camera is pointing to help orient the operator.	1			
CT002G1	The system administrator shall be able to place labels on the static image to identify roads or landmarks in the scene.	1			
CT002L	A "lock" shall be acquired when a camera is selected if no other user holds a "lock". A lock prevents others from controlling the camera.	1			
CT002T	The CCTV tour function shall allow an operator with appropriate permissions to specify how long the video from a selected source will be provided to the video switch output.	1			
CT002T1	The operator shall be able to specify how long the video from a selected source is supplied to the video switch output in terms of seconds.	1			
CT003	The CCTV function shall provide the capability for an operator with appropriate permissions to define, schedule and execute a sequence of camera commands called a schedule.	3			
CT003C	Sequences may be activated or deactivated by an operator with appropriate permissions without being added to a schedule.	3			
CT003D	Manufacturer-specific drivers shall, at a minimum, provide functionality equal to that provided via NTCIP mandatory objects, provided the manufacturer's protocol supports the functionality (i.e. 2 way communications).	1			
CT003L	Operator activation of any camera motion control shall automatically request a lock on the camera.	1			

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CT003L1	It shall not be necessary to press a "lock" button before moving a camera.	1			
CT003T	The operator shall be able to block or unblock video from any of the video sources in a video tour within 1 second.	1			
CT004	The CCTV function shall display a static 360 degree panoramic view of the scene with a box indicating the current viewing angle of the camera when a camera is selected for control by an operator.	1			
CT004C	When activating a sequence, the operator shall be able to specify the information needed to run the sequence; the associated CCTV, duration, and whether the sequence should repeat and how many times it should repeat.	3			
CT004D	The CCTV range objects shall be implemented in the device drivers and, at a minimum, shall include: <ul style="list-style-type: none"> • A maximum number of camera pre-sets parameter • Pan left limit parameters • Pan right limit parameters • Pan home position parameters • True north offset parameters • Tilt up limit parameters • Tilt down limit parameters • Zoom limit parameters • Focus limit parameters • Iris limit parameters • Maximum pan step angle parameters • Maximum tilt step angle parameters 	1			
CT004L	The requested camera lock shall automatically time out after a configurable amount of time after no camera movement.	1			
CT004L1	Smartlink shall allow the lockout time to be configured by a system administrator with appropriate permissions.	1			

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CT004L2	The configurable amount of time used to end a lock out after the camera has remained stationary shall apply to all cameras.	1			
CT004T	The operator shall be able to specify the sequence in which video sources will be selected for the tour and whether or not the tour is to repeat and how many time it will repeat from one time to continuous.	1			
CT004T1	The operator shall be able to schedule when a video tour will start and end by time of day, day of week or week of the month.	1			
CT004T2	Smartlink video tour function shall alert the operator to a conflict between the video tours parameters and the scheduled start and end time in case the duration of the video tour exceeds the difference between the start and end times specified in the schedule.	1			
CT005	The CCTV function shall allow the operator with appropriate permissions to create, edit, delete and save video tours defined as a sequence of images or video streams from different CCTV cameras controlled by Smartlink to be routed to a single video output.	1			
CT005C	CCTV Scheduler function shall allow one or more cameras as a group to be moved to predefined presets.	3			
CT005C1	The group pre-set command shall be able to be a “perform now” type of action.	3			
CT005C2	The group pre-set command shall be able to be scheduled to occur at certain times of day.	3			

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CT005D	The device drivers shall contain the CCTV timeout objects and shall include the following parameters, at a minimum: • Pan timeout parameters• Tilt timeout parameters• Zoom timeout parameters• Focus timeout parameters• Iris timeout parameters	1			
CT006C	The CCTV Preset Scheduler function shall be such that if a camera is locked by an operator while a schedule is active or in progress, the schedule will resume with the action currently scheduled following release of the lock.	3			
CT006C1	The scheduler shall continue to generate CCTV commands in accordance with the schedule even if the camera is locked.	3			
CT006C2	CCTV Schedule commands shall be issued to the designated CCTV(s) only if the CCTV is not locked.	3			
CT006C3	The operator shall be able to suspend and resume the schedule for a specific camera or cameras through the use of the CCTV GUI.	3			
CT006C4	An operator-suspended schedule shall, after a user defined time period, notify an operator that it is still suspended, allowing them the option to continue suspending, or to resume schedule.	3			
CT006D	The device driver shall contain CCTV preset objects and shall include the following parameters at a minimum:• Go to preset position parameters• Store preset position parameters• Pan position parameters• Tilt position parameters• Lens zoom position parameter• Lens focus position parameter• Lens iris position parameter	1			

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CT006D1	The azimuth and elevation of the CCTV shall be able to be associated with each preset.	1			
CT007D	The device drivers shall contain CCTV system feature control objects, and the following parameters and characteristics: <ul style="list-style-type: none"> • System camera feature control parameters • System camera feature status • System camera equipment availability parameters • System lens feature control parameters • System lens feature status parameters • System lens equipment availability parameter 	1			
CT008D	The device driver shall contain the following CCTV alarm objects: <ul style="list-style-type: none"> • Alarm status parameters • Alarm latch status parameters • Alarm latch clear parameters • Temperature alarm high-low threshold • Temperature alarm current value parameters • Pressure alarm high-low threshold parameters • Pressure alarm current values • Washer fluid alarm high-low threshold parameters • Washer fluid alarm current value parameters • Alarm label index parameter 	1			
CT009D	The device driver shall contain the following CCTV discrete input objects: <ul style="list-style-type: none"> • Discrete input status parameters • Discrete input latch status parameters • Discrete input latch clear parameters • Discrete input label index parameters 	1			
CT010D	The device driver shall contain the following CCTV discrete output objects: <ul style="list-style-type: none"> • Discrete output status parameters • Discrete output control parameters • Discrete output label indexes 	1			

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CT011D	The device driver shall contain the following CCTV zone parameters: • Maximum number of zones parameter • Zone tables	1			
CT012D	The device driver shall contain the following CCTV label objects: • Maximum number of labels parameters • Label tables • Label location parameters • Enable label text displays	1			
CT013D	The device driver shall contain CCTV on-screen camera menu objects to the extent supported by NTCIP: • Activate menu parameters • Menu control parameters	1			
CT014D	The CCTV driver shall also support cameras with IP-based controls.	1			
DB001	Smartlink shall use either Microsoft SQL Server 2008R2 or an Oracle database management system, if it is Oracle version 11.2 or newer shall be used.	1			
DB001A	Saved data shall be retained in the Database subsystem for a minimum of 90 days.	1			
DB001A1	Archived data shall be able to be transferred to long term external storage media.	1			
DB001A2	Archived data shall be able to be ingested from external storage media for Smartlink processing.	1			
DB001R	Smartlink shall have a recovery point objective (RPO) of having less than 65/100ths of a percent (0.065%) difference between the master database and the recovery copy of the database at all times.	1			
DB002	The database subsystem shall have an operational availability of at least 99.93% over an operating cycle of 24 hours starting at midnight.	1			

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DB002R	The recovery time objective (RTO) shall be one minute or less for system failures involving only a portion of Smartlink.	1			
DB002R1	The recovery time objective (RTO) shall be 24 hours or less for situations where the Smartlink system must be reconstituted from scratch with new servers and network infrastructure.	1			
DB003	The database shall be a modular abstraction layer to allow subsystems to retrieve data.	1			
DB003R	The time it takes to automatically switch over to a backup database in the event of a failure of the primary one shall be less than 1 minute.	1			
DB004	The database shall have an ICD for client data exchange and an ICD for subsystem data exchange.	1			
DB005	The Database shall be able to store historical data for traffic management devices for a minimum of one year, the period of time being programmable at the system administrator level.	1			
DB006	The system shall be capable of running in a clustered database configuration.	1			
DB007	Smartlink shall automatically detect a failure of the database server or software and failover to a backup database.	1			
DB008	Smartlink database shall store the details of how an incident was managed in a timeline such that information can be filtered by any of the fields associated with how an incident is managed.	1			
DB009	Smartlink Lite shall be capable of being operated with a database management system (DBMS) designed for use on a PC.	1			

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DM001	The Dynamic Message Sign subsystem shall use device drivers capable of sending all messages as defined in the DMS message database or messages created manually and receiving sign status to the extent supported by the sign when requested.	1			
DM001A	Smartlink shall provide an incident type called “Amber Alert” and an incident type called “Silver Alert” each associated with a DMS message template specific for the incident type.	2			
DM001A1	One Amber Alert Message template shall contain fields for the operator to fill in for specific information related to vehicle make/model, vehicle color and license tag number.	2			
DM001A2	The second AMBER Alert template shall contain fields for the operator to fill in for specific information about the abductor or abductees' information.	2			
DM001A3	A SILVER Alert template shall contain fields for the operator to fill in for specific information about the missing person and location last seen.	2			
DM001C	The Dynamic Message Sign subsystem shall have a configurable parameter that is used to indicate whether or not an operator has to approve the posting of the DMS message received from another Smartlink system.	2			
DM001D	Each DMS sign driver shall have configurable default on and off times for each message phase of the sign.	1			
DM001L	Message Library entries shall be sorted in alphanumeric order within a library	1			

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DM001M	The DMS Message shall adhere to the following format: Line 1 = What (location of incident using lane reference shown in related picture) Line 2 = Where (problem that needs the DMS message) Line 3 = When or Reference Location (location)	1			
DM001P	If a message is placed in the queue with a higher priority than the currently displayed message, the higher-priority message shall be displayed on the sign and the operator notified.	1			
DM001R	Smartlink shall display the location of Reversible Lane Signs on the Smartlink map using an icon different from the DMS icon.	1			
DM001S	The information requested in the regular periodic poll of DMS devices shall include basic error information from the device, including, but not limited to, pixel, lamp, temperature, power supply status, filter status and fan errors. For NTCIP devices, this shall be accomplished by utilizing the "short error status" object.	1			
DM001T	The Smartlink system administrator shall be able to specify what the default message will be on any DMS sign under their control which can include safety messages or travel time messages or be blank that appear 24 hours a day, 7 days a week, except when it is overridden by a higher-priority message.	2			
DM001T1	If a travel time message is the selected default message and travel times are unavailable for a particular segment, the default message on the associated DMS shall be blank until the data are restored.	2			

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DM002	The Dynamic Message Sign subsystem shall implement a database of standard messages.	1			
DM002A	Smartlink shall have a configurable parameter that automatically assigns an AMBER or SILVER Alert message a priority specified by the system administrator.	1			
DM002C	Requests to put a message on a DMS received via the C2C interface shall be validated.	2			
DM002C1	Validation shall require that the requestor from another C2C site be allowed access to Smartlink to post messages.	2			
DM002C2	The Dynamic Message subsystem shall have an administrative setting to indicate either; that all messages must be approved by an operator with permission to approve DMS messages at the site that owns the DMS or that messages from a validated requestor shall be automatically posted without operator intervention at the site owning the DMS.	2			
DM002C3	Messages that are blocked because a word is on the non-approved word list at the site that owns the DMS shall be referred to an operator at the site to resolve the problem and if no operators are on duty, the message shall be rejected and the requesting site shall be informed of the action taken.	2			
DM002C4	If a message is currently displayed on a DMS that another site is trying to place a message on through C2C, the remote site shall be notified there is already a message on that sign.	2			

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DM002D	The Dynamic Message Sign subsystem shall have a configuration setting that specifies how many message phases will be allowed for any message generated for each sign.	2			
DM002L	If the Dynamic Message Sign subsystem detects a word list conflict in a message being activated as part of a sequence, the system shall alert the operator of the conflict and prompt for a decision, just as if the message had been activated manually.	1			
DM002M	Smartlinksoftware shall be able to configure a font to use with a Smartlink defined DMS to either use proportional fonts that are user specified for each type of DMS or to use fixed width font. This requirement applies to Mark IV and NTCIP complaint DMS devices.	1			
DM002M1	Smartlink shall require that a font be assigned to each DMS sign.	1			
DM002M2	Smartlink shall allow a user to define a font for each type of DMS in use using the following characteristics: ☐Name of font, ☐Character height in pixels, ☐Default character width in pixels, and ☐Width in pixels for any characters whose width differs from the default.	3			
DM002M3	Smartlink shall allow a user to specify the width in pixels for any characters whose width differs from the default.	3			
DM002M4	Smartlink shall be able to communicate with and control portable message signs that are supported by the NCDOT communications infrastructure.	1			

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DM002P	When a message is removed from the queue, the message with the next highest priority shall be activated.	1			
DM002R	The Smartlink operator shall be able to see what the current sign configuration is for any RLS by clicking on the RLS icon on the Smartlink map and looking at a display of what the current sign configuration is and what it is displaying for each lane	1			
DM002S	If any errors (including, but not limited to, pixel, lamp, temperature, or fan errors) are reported during the regular polling of a DMS sign, the system shall: generate an operator alert and change the color of the icon for the DMS sign on the map to a configurable color.	1			
DM002S1	DMS operator alerts shall be able to be toggled off or on for individual DMS units by the operator at their workstation.	1			
DM002S2	DMS alerts will be active upon operator log in.	1			
DM002T	Travel time messages shall be able to be configured to have one or two DMS phases.	2			
DM002T1	The DMS shall show the travel time from the sign to the nearest downstream junction.	2			
DM002T2	In two-phase messages the second phase shall show the travel time to a junction further downstream.	2			
DM003	The Dynamic Message Sign subsystem database shall contain a Message Library that contains a list of preconfigured standard messages used by the NCDOT that is editable by a system administrator with appropriate permissions.	1			

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DM003A	An AMBER/SILVER Alert message received through the Center-to-Center link shall not require approval by the operator for Smartlink to place messages on blank DMSs.	2			
DM003A1	If an AMBER Alert message or SILVER alert message received through the Center-to-Center link conflicts with another message of equal priority already posted on a DMS, the sender of the Amber Alert message will be notified of the conflict and a local operator will also be notified to resolve the conflict.	2			
DM003C	Smartlink shall publish the maximum number of characters per line for each DMS in the inventory information sent through C2C.	2			
DM003C1	No proportional font information shall be sent over the C2C interface.	2			
DM003D	The Dynamic Message Sign subsystem device driver shall be capable of sending all messages as defined in the DMS message database.	1			
DM003L	When choosing a message from a message library, the system shall accept letters typed by the operator, and scroll the message list to the first message matching these letters.	1			
DM003M	As a default Smartlink shall horizontally center all lines on the sign with respect to the pixel length of the message line versus the pixel width of the sign.	3			
DM003M1	The operator shall be able to over ride the default and select any of the signs' text capabilities including but not limited to; use L, C, R, and top, middle and bottom lines, bold, italic, upper and lower case fonts.	3			

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DM003P	If the queue for a DMS becomes empty, the sign shall blank.	3			
DM003R	The Smartlink operator with appropriate permissions shall be able to change the sign display for any lane sign by clicking on the lane sign and toggling through each of the 12 possible displays.	1			
DM003R1	The twelve symbols are: green downward pointing arrow, yellow downward pointing arrow, diagonal yellow arrow, right diagonal yellow arrow, white flip flop arrows, red X, white straight arrow, white through left symbol, white through right symbol, combined white through left and through right turn only signals, and a blank display.	1			
DM003S	The Dynamic Message Sign subsystem shall interface with the operator to provide a way to request and display the extended status information available from a DMS to include but not limited to: fan status, pixel errors, sign temperatures, and filter and power supply status.	1			
DM004	Smartlink shall provide a message template to customize the format of DMS messages such as what type of information goes on each line of the DMS.	2			
DM004L	The message library shall contain a prioritized list of abbreviations for words to be used in limiting messages to fit in the number of phases specified for the sign.	2			

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DM004L1	The list of abbreviations for words to be used in DMS messages shall be tiered such that the longer abbreviation is listed first followed by a shorter version of the abbreviation followed by an even shorter version so the Smartlink software can choose the right combination of abbreviations to make the message fit the sign.	2			
DM004M	DMS shall use each device's font characteristics to determine whether a message can be displayed or not.	1			
DM004P	If two messages of the same priority are on the queue, the operator will be notified and asked to decide which will be displayed first.	1			
DM004R	The Dynamic Message Sign subsystem shall be able to be set to periodically poll each RLS for status and to verify the ability to communicate with the sign on all the communication paths provided for the sign.	1			
DM004R1	The frequency the signs are polled shall be configurable by the system administrator.	1			
DM004S	The Dynamic Message Sign subsystem shall poll DMS devices on all communications links available to the device to include primary and secondary communication channels and shall report failures specific to the communications channel used.	1			
DM004S1	The Dynamic Message Sign subsystem shall report failures specific to the communications channel used.	1			
DM005	Smartlink shall support a priority-based queue for DMS messages.	1			
DM005L	The message library shall contain a list of words that are not approved for use on DMS signs.	2			

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DM005L1	The message library list of words that are not approved for use on DMS signs shall be able to be created, edited and deleted by the system administrator.	2			
DM005M	Smartlink shall provide a minimum of five (5) message templates for each DMS in the Division's inventory (not to exceed 600 signs).	2			
DM005P	The default priority level for manual message activation shall be the highest priority level.	1			
DM005S	The Dynamic Message Sign subsystem shall periodically poll each DMS to obtain status and the current message being displayed.	1			
DM005S1	DMS polling interval shall be configurable by the system administrator.	1			
DM005S2	The Dynamic Message Sign subsystem shall indicate on the operator's GUI display of what message is on a particular DMS sign what the last date/time was when the sign was successfully polled indicating how current the message display is on the GUI.	1			
DM005S3	DMS subsystem shall display a "last updated" timestamp along with the message.	1			
DM006	The Dynamic Message Sign subsystem shall be able to be set to periodically poll each DMS for status and to verify the ability to communicate with the sign on all the communication paths provided for the sign.	1			
DM006P	Smartlink shall provide a mechanism for prioritizing messages generated by the Incident Management subsystem based on distance from the incident, with messages on signs closer to the incident being given higher priority. These messages and signs are called a response plan.	1			

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DM006P1	Smartlink shall support at least 256 message priority levels	1			
DM007	It shall be possible to place a message on multiple DMS at the same time.	1			
DM007M	Smartlink administration shall have a permission field for the DMS subsystem to indicate which users can generate a manual message for a DMS.	1			
DM008	Smartlink shall allow other sites that have Center-to-Center connectivity with Smartlink to place messages on the DMS at the Smartlink facility.	2			
DM008M	Smartlink administration shall have a permission field for the DMS subsystem to indicate which users can edit a DMS message.	1			
DM009	Smartlink shall be able to automatically post travel time messages on operator selected DMS.	2			
DM009M	DMS message shall have a time out with a configurable default value that will cause the message to be removed from a message queue once the time limit expires.	1			
DM010	To inform drivers of an incident, Smartlink shall support the creation of a DMS message in three parts with each part associated with a line on the DMS.	1			
DM010M	Smartlink DMS subsystem shall provide an auto-complete feature that fills in the word being typed based on the letters entered by the operator.	1			
DM010M1	The auto-complete feature shall be able to be turned on and off by the operator through the operator GUI.	1			
DM011	The DMS database shall contain DMS sign operating parameters..	1			

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DM012	The Dynamic Message Sign subsystem shall provide a method for restricting overwriting an essential (e.g., incident related) message on a DMS.	1			
DM013	Smartlink shall allow only users with appropriate permissions to create or edit DMS messages.	1			
DM014	Smartlink shall generate a DMS message on signs upstream from an RWIS that is reporting visibility less than a quarter mile and state the current visibility and reference where the low visibility was reported.	1			
DM015	Smartlink shall be able to interface with reversible lane signs.	1			
GU001A	The Graphical User Interface component shall support the configuration and administration of the system.	1			
GU001C	The CCTV icon color shall change when the schedule activates and return to its normal color when the schedule no longer applies.	3			
GU001C1	The GUI shall provide an operator with the ability to designate a color for the CCTV icon when it is associated with a schedule as opposed to the normal color for when the CCTV is available or out of service.	3			
GU001C2	It shall be possible to assign a color to a CCTV icon to indicate status including: <ul style="list-style-type: none"> • locked (in use) • touring (included in a schedule) • available • failed 	3			

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GU001C3	The CCTV icon color shall remain the same when an operator takes control of the camera (e.g. locks it).	3			
GU001D	The Smartlink GUI in all operator viewable screens shall show the correct number of characters per line but will not use proportional font spacing to display the message proposed for a sign or sent to the sign.	1			
GU001E	The Smartlink GUI shall provide selectable (on/off) map layers that shall be utilized to indicate the location of a variety of information/data points, including: <ul style="list-style-type: none"> • Travel times/speeds and/or traffic flow/congestion (Roadway links will be color-coded according to roadway condition.) • Incidents/Events • Roadwork and Other Construction • Lane and Road Closure • Severe Weather • CCTV locations - clicking on a CCTV icon will result in a pop-up window appearing in which the current video (either snapshot or streaming) will be displayed along with a time stamp indicating the time the image was captured. • Locations of DMS - clicking on a DMS icon will result in a pop-up window appearing in which the current text on that DMS is displayed. 	1			
GU001H	Smartlink shall provide an operator interface for control of Highway Advisory Radio devices.	1			
GU001H1	The Smartlink operator shall be able to determine what the current message is on each HAR device.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
GU001M	On the detailed status display for any equipment that Smartlink polls to obtain status for, there shall be a radio button or similar icon that the operator can click on to automatically send an e-mail to designated maintenance personnel.	2			
GU001R	The Smartlink GUI shall support the customizing and generation of reports.	1			
GU001S	The Smartlink GUI shall allow an operator with the appropriate privileges to edit a travel time message template and save the edits under a new name as the current travel time message template.	1			
GU001V	All display characteristics of the video wall shall be accessible through the Smartlink GUI.	2			
GU001W	The RWIS user interface shall be a software application within the Smartlink system that displays the required RWIS data fields	1			
GU001W1	It shall be possible for any workstation within the Smartlink to access the RWIS user interface and the data from all RWIS system components statewide.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
GU001W2	<p>The user interface shall provide the following data fields relative to each RWIS field unit:</p> <ul style="list-style-type: none"> • Name; • Location; • Data age; • Air temperature; • Dew point temperature; • Relative humidity; • Precipitation type • Precipitation intensity; • Precipitation rate; • Precipitation accumulation; • Visibility; • Average wind speed; • Wind gust speed; • Wind direction; • Surface sensor name; • Surface temperature; • Freeze point; • Chemical factor; • Chemical percent; and • Ice percent 	1			
GU001X	<p>The GUI shall provide a means for the operator to adjust the amount of data logged for an error condition in real-time without having to restart the application.</p>	1			
GU002D	<p>The DMS status display on the Smartlink GUI shall provide a way for the operator to request and display the following extended status information from the signs: fan status, pixel errors, sign temperatures, and power supply status.</p>	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
GU002E	Smartlink shall provide a color-coded real time representation (overlaid on a map) of speed data	1			
GU002H	Smartlink shall provide the operator with the ability to create a manual message for a HAR device and send it to the device.	1			
GU002R	The Smartlink GUI shall provide data fields in the incident record for the operator to enter time and date information used to calculate performance measures.	1			
GU002R1	The operator shall be able to leave any of the fields blank in case that information is not available, except that a record must have at least one timestamp entered.	1			
GU002R10	The GUI shall provide an event chronology summary window with the ability to generate a report.	1			
GU002R11	A comments field shall be provided for the operator to enter free-text data.	1			
GU002R2	The operator shall be able to add, delete, or edit vehicle response records for agencies with responding vehicles.	1			
GU002R3	The operator shall be required to provide the notification time and either the arrival and departure times or the cancellation time.	1			
GU002R4	The operator shall be able to add, edit, and delete activity records associated with vehicle response records.	1			
GU002R5	The software shall require the operator to enter the time that an activity was performed, however the software shall also require the timestamp to fall within the arrival and departure timestamps for the vehicle record.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
GU002R6	The GUI shall warn the user when a timestamp is entered which is earlier than the event start time or later than the event closed time.	1			
GU002R7	The operator shall have the option to enter a quantity associated with an IMAP activity, such as gas, when the activity is configured as "quantifiable".	1			
GU002R8	The GUI shall display a summary of all the agency response times, the detailed vehicle response time records, and all the activities performed.	1			
GU002R9	The GUI shall display the event location, event number, and blockage history for an event.	1			
GU002S	The Smartlink GUI shall allow an operator with appropriate permissions to designate sections of instrumented roadway to be identified as links for travel time computations.	1			
GU002W	The GUI shall be able to alert the Smartlink operator if a specific RWIS data element exceeds an administrator set threshold. An example would be to alert the operator if the RWIS reported visibility is less than an eighth of a mile.	1			
GU002X	The GUI shall be able to display a continuously viewable "errors list" in the form of an error log.	1			
GU003C	An operator with appropriate permissions shall be able to display the currently active sequences and schedules on the operator map GUI.	3			
GU003D	The GUI shall allow an operator with appropriate permissions to select multiple DMS and place the same message on them at the same time.	1			
GU003D1	The operator shall be able to graphically select multiple DMS and place the same message on them at the same time.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
GU003D2	The operator shall be able to select a group of DMS and send the same message to them simultaneously.	1			
GU003E	Smartlink GUI shall support the entry of the exact location and direction of traffic incidents.	1			
GU003X	The GUI shall provide a tool to review operator logs.	1			
GU004D	The GUI shall allow an operator with appropriate permissions to graphically select one of 12 symbols to be placed on each lane panel of the reversible lane sign.	1			
GU004D1	The twelve symbols are: green downward pointing arrow, yellow downward pointing arrow, diagonal yellow arrow, right diagonal yellow arrow, white flip flop arrows, red X, white straight arrow, white through left symbol, white through right symbol, combined white through left and through right turn only signals, and a blank display.	1			
GU004E	The Smartlink GUI shall provide for the ability for the operator to enter incident type either by checkbox or drop down menu.	1			
GU004E1	Incident types shall be selected from the SAE J2540-1 standard.	1			
GU005C	The Smartlink GUI incident management event entry screen shall provide a field for the operator to enter the ID of an incident that is currently open or has been closed within the last hour that is considered to be a primary incident causing the incident being created or edited.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
GU005D	The GUI shall display a graphic depiction of the Reversible Lane Sign that reflects the configuration of the actual sign so that if the sign has six lane control panels, the graphic will show six panels and if it has only three, the graphic will show three.	1			
GU005E	The Smartlink GUI shall provide drop-down menus, check boxes, and data interfaces with subsystems such as but not limited to: the RWIS, vehicle detection, interfaces with other sources of transportation incidents, HAR, DMSs, and CCTVs.	1			
GU006E	The Smartlink GUI shall provide the workstation operator with the ability to create and maintain lists of personnel and contact numbers as well as a catalog of agency resources via drop-down menus that can be used to help manage an incident.	1			
GU008E	The GUI shall display a list of Smartlink operators actively working an incident.	1			
GU009E	The Smartlink GUI shall provide the operator with a list of personnel and contact numbers as well as a catalog of agency resources relevant to an incident being managed.	1			
GU010E	Smartlink GUI shall display information regarding the incident's current status, the overall progress towards clearance, and the equipment required to complete the process.	1			
GU011E	In response to incidents requiring alternate route(s), the GUI shall provide the Smartlink operator the ability to select alternate routes via appropriately named drop-down menus.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
GU012E	The queue status GUI screen shall provide the following: 1) a display of the contents of the message queue, including message, priority, and associated incident ID, if any, for each message in the queue; 2) the ability to remove individual messages from the message queue; 3) a "blank" button that removes all messages from the queue; 4) the ability to change priority of messages on the queue; and 5) the number of phases in the message.	1			
GU013E	The GUI shall periodically sound an audible alarm at all logged-on workstations if there is any active incident without an owner as indicated by the Incident Management subsystem.	1			
GU013E1	The operator shall be able to turn the audio alarm on or off either by zones or globally for their workstation.	1			
GU013E2	The operator shall be able to turn the visual alarm on or off either by zones or globally for their workstation.	1			
GU013E3	The operator shall be able to turn both the audio and visual alarm on or off together either by zones or globally for their workstation.	1			
GU014E	The GUI shall display the hierarchy of traffic management activities for review by Smartlink operations managers.	1			
GU015E	When an operator hovers the mouse cursor over an AVL icon on the Smartlink map, the GUI shall display a "tooltip" like status box that shows the vehicle summary data.	3			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
GU015E1	The Detailed Vehicle Status window shall display the following information about the most recently selected AVL vehicle icon: Vehicle ID, speed, heading, location, status, stopped time, amount of time moving since last stop, operator, patrol route/zone, nearest reference location (cross street or milepost), distance to nearest reference location, and, if available, the following information about the incident the vehicle is responding to: Incident ID, incident severity, incident type, incident description.	3			
GU016E	The relevant AVL icon shall appear different in shape and color, depending on the availability status reported by data feed from the vehicle.	3			
GU016E1	The last reported position of the IMAP vehicle shall be displayed in the IMAP Vehicle List and on the GUI map whether or not it is actively reporting position.	3			
GU016E2	IMAP status shall include current IMAP vehicle position speed and status from the AVL component of the IMAP Dispatch subsystem.	3			
GU017E	An operator shall be able to bring up a detailed vehicle status window by right-clicking on an AVL icon and selecting "show detailed status".	3			
GU017E1	The operator shall be able to display information about a different vehicle in the Detailed Vehicle Status window by clicking on any other visible AVL icon	3			
GU018E	The operator with appropriate permissions shall be able to right click on the Smartlink map in an area without any symbols and get a menu of "AVL Replay" options to generate a historical track of a selected vehicle overlaid on the Smartlink map.	3			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
GU018E1	The Smartlink GUI shall support the identification and entry of alternate routes tied to sections of roads as defined by the operator.	1			
GU019E	An IMAP Vehicle List window shall be provided that displays a tabular listing of all the AVL-enabled IMAP vehicles that are actively reporting their positions.	3			
GU020E	An operator shall be able to create an incident, with location information pre-filled by right-clicking on an AVL icon and choosing "create new incident at vehicle location".	3			
GU021E	Smartlink shall identify the source of incident information and display it to the operator.	1			
GU022E	The Operator GUI shall provide NCDOT approved color-coding schemes for road segments on both maps and/or icons.	1			
GU022E1	Icons representing incident data shall display information available from the TIMS database for Interstate, US, NC and SR routes when moused over or clicked on.	1			
GU023E	The GUI shall use a GIS map database that uses or works with ARCVIEW/ESRI products.	1			
GU024E	Smartlink shall create a probable incident icon on the operator map that is based on information received from other CAD systems.	2			
GU025E	If a non-active status (gas, meal, inspection, etc.) is received in the AVL feed, the AVL icon shall remain normal.	2			
GU026E	A "more noticeable" icon (e.g. flashing, larger, exclamation) shall be used when a vehicle stops or leaves the geo-fenced area without justification (non-patrolling status entered into the IMAP in-vehicle reporting device).	2			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
HP001	Smartlink shall interface with the TIMS to acquire North Carolina State Highway Patrol Computer Aided Dispatch system incident information.	2			
HP002	Smartlink shall compare the SHP reported incidents against incidents currently being tracked by Smartlink to identify duplicate reports and notify an operator to delete them.	2			
HR001	Smartlink shall provide interfaces for controlling Highway Advisory Radio devices using cellular telephone communications.	1			
HR001Q	If a HAR message is placed in the queue with a higher priority than the currently displayed message, the higher-priority message shall be played on the device.	1			
HR002	Smartlink shall support a priority-based queue for HAR messages.	1			
HR002Q	When a message is removed from the HAR queue, the HAR message with the next highest priority shall be activated.	1			
HR003	All HAR messages shall be logged to the database for archival purposes.	1			
HR003Q	No message shall be broadcast when the HAR message queue is or becomes empty.	1			
HR003Q1	If two messages of the same priority are in the queue, the system will alert the operator to choose which one to be played first.	1			
HR004	The HAR subsystem shall support the creation and broadcast of messages in either English or Spanish.	3			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
IM001	Smartlink shall provide an Incident Management function to help operators manage incidents.	1			
IM001R	Smartlink shall provide a mechanism to include DMS devices available from the C2C interface when generating an Incident Management response plan.	2			
IM001S	The incident management subsystem shall indicate to the Smartlink operator which CCTV camera is closest to an incident.	2			
IM002	The Smartlink incident management subsystem shall provide traffic information to other subsystems to support the management and dissemination of traffic and traveler information.	1			
IM002R	The incident management response function shall recommend a set of DMS/HAR device locations and messages for the workstation operator to select.	1			
IM002R1	The incident response plan shall suggest all DMS/HAR devices on roadways leading to the incident location within the distance specified by the operator in accordance with the severity of the incident. The more severe an incident is the greater the number of DMS that are included in the response plan so that drivers are warned earlier of the incident as they approach it.	1			
IM002R2	When a response plan is cancelled, all messages that were part of the response plan shall be removed from the priority queues of the devices they were placed in.	1			
IM002R3	When an incident is closed, the response plan associated with the incident shall be canceled.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
IM002R4	The incident management function shall use the font characteristics of each DMS to determine response plan messages.	1			
IM002S	The incident management function shall provide the appropriate names and contacts of responders based on the location and severity of the incident.	1			
IM002S1	The personnel list shall be on a geographic basis and, at a minimum, shall include: Response personnel and contacts Response personnel and contacts Geographic agency responsibilities Talk list (i.e., responders contact list) Radio frequencies Phone and facsimile numbers Pager numbers	1			
IM002S2	The incident management function shall support the cataloging of incident management teams and resources with a listing of equipment, material, and available personnel who possess special skills.	1			
IM003	Smartlink shall have the ability to recognize traffic data indicative of an incident and alert the operator for confirmation.	1			
IM003R	The incident management response function shall recommend alternate routes in response to incidents that are blocking roadways.	1			
IM003R1	In response to incidents requiring alternate route(s), the incident management function shall provide a list of one or more alternate routes.	1			
IM003R2	The incident management function shall maintain a list of alternate routes for selected sections of roads that could be closed due to construction or an incident.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
IM003R3	When appropriate, the incident management response function shall communicate with the DMS subsystem to post detour messages on portable message signs.	3			
IM003R4	The incident management response function shall support a hierarchy of traffic management activities and display these activities for review by Smartlink operations managers.	1			
IM003S	The incident management response function shall provide support to the incident clearance process by the cataloging of resources (i.e. tow trucks, wreckers) for the removal of all types of incidents.	1			
IM003S1	Included in the catalog shall be the resource, location, cost of service, and availability of related equipment and resources.	1			
IM004	Smartlink shall have the ability to generate a response plan to an incident that recommends messages to inform drivers of the incident and alternative actions (e.g. detours) to be posted on selected DMS and HAR devices based on incident severity.	1			
IM004S	The incident management function shall provide a quick click interface to the GIS maps for the display and location of resources, such as but not limited to: tow truck services, ambulance dispatch services, hospitals, HAZMAT response teams, state and local police headquarters.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
IM005	The Smartlink incident management function shall require a minimal number of key strokes for the entry of traffic incidents by automatically filling in incident information such as but not limited to : incident location (main street and nearest intersection or freeway exit, bearing and distance to the nearest intersection or exit if applicable), direction of travel, time of day and date, lanes affected, source of notification, and other data that can be determined automatically.	1			
IM005S	The incident ID shall roll over to 1 when it exceeds 4,294,967,296.	1			
IM006	The incident management subsystem shall monitor and log traffic flow and incident information and traffic event data until the incident is cleared and the traffic flow is back to normal.	1			
IM006S	When a data field in an incident form requires entry of a time and/or date, the current time and/or date shall appear as the default entry, if appropriate for the field.	1			
IM006S1	An incident record shall contain a text field for entry of free text comments and annotations such as milepost location information.	1			
IM006S2	An incident record shall identify the source of the incident notification.	1			
IM007	The incident management function shall maintain personnel lists and contact numbers as well as a catalog of agency resources to be available to the operator to manage an incident.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
IM008	It shall be possible for the operator to create an incident, enter required basic information and select appropriate signs and/or HARs within 60 seconds of when the operator confirms the incident. Required basic information consists of: incident description; route; direction; cross street; and lane configuration	1			
IM009	When a new incident is created, it shall automatically be assigned a sequential incident ID number. This number shall appear, along with the textual incident ID, in every place that it appears.	1			
IM010	The incident management subsystem shall support a priority-based queue of messages for DMS/HAR device dissemination.	1			
IM010S	List of Smartlink operators managing each incident shall be displayed in the incident list.	1			
IM011	An incident, exclusive of construction or planned events, shall have ownership characteristic where the person or persons who are managing the incident shall be identified as the actively managing the incident and the list of Smartlink operators actively managing the incident shall be displayed when incident status is displayed.	1			
IM011S	It shall be possible to filter the incident list by who is managing the incident.	1			
IM012	The incident management subsystem shall support three severity levels of incidents that will have a configurable distance (in miles) for which devices for messages will be selected: Level 3 (most severe-critical), Level 2 (important), and Level 1 (least severe-routine).	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
IM012S2	Lane segments associated with unacknowledged alarms shall flash on the map.	2			
IM013	Incidents shall always be associated with a roadway defined in the Smartlink network of roads.	1			
IM013S	When an operator logs off of Smartlink, all incidents that were managed by the operator shall have the operator's name deleted from the list of operators actively managing the incident.	1			
IM014	The incident management response function shall recommend a set of pre-recorded HAR messages to be activated.	1			
IM014S	All incident management changes shall be logged to the database.	1			
IM015	The incident management function shall provide to the GUI subsystem information regarding the incident's current status, the overall progress towards clearance, and the equipment required to complete the process.	1			
IM015S	Secondary incidents shall be associated with a primary incident.	1			
IM015S1	A secondary incident shall have a link to the "incident details" screen of the primary event that the secondary incident is associated with.	1			
IM016	The incident management function shall support Smartlink operators with traffic control procedures that include, at a minimum, dispatching IMAV vehicles to clear congestion and alerting drivers of the availability of alternate routes.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
IM016S	The Data Fusion component of the Incident management subsystem shall correlate geo-located weather events with covered roads and associate the weather event as a part of a Smartlink incident.	1			
IM017	Smartlink shall log the details of how an incident was managed in a timeline to include but not be limited to DMS/HAR messages posted on what DMSs/HARs and the date and time the message was sent to the signs, what operators worked the incident, the incident timeline, what CCTVs were used, when they were positioned, if possible record the azimuth, elevation and zoom values for each position the camera moved to, what IMAP was dispatched and its associated timeline along with other responder timelines.	1			
IM017S	New weather information shall be incorporated in the incident management subsystem and be available to be displayed to the operator within 60 seconds of when weather events change.	1			
IM018	Smartlink shall receive incident information using the IEEE 1512(IEEE 1512.1 through IEEE 1512.4) family of standards from CAD systems using the same standards.	2			
IM018S	When an incident is created from a congestion alert associated with a detector link, or when manually created by an operator clicking on a detector link, the following information in the incident form shall be filled in automatically: route (main road), direction, nearest cross street (bearing and distance from cross street if not at the cross street), lane configuration, and milepost number.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
IM019S	The incident management function shall provide the ability to alert personnel of incidents by redirecting key incident information to standard message services (such as fax, email, pagers, etc.).	1			
IM020S	The Data Fusion component of the Incident management subsystem shall incorporate weather conditions.	1			
IM021S	Smartlink shall integrate geo-spatial data from the TIMS and process the data to resolve duplicate information or conflicts with Smartlink incidents.	1			
IM022S	Smartlink shall have a maximum of 1 false incident detection every 3 hours provided the traffic detectors are working correctly and are correctly calibrated.	1			
IM023S	Sources of incident data shall include the following sources: TIMS to include NC SHP; Smartlink Center; other Centers by name or ID that are sending data via C2C to Smartlink.	1			
IM023S	Smartlink shall create a probable incident and fill in as much of the incident data fields automatically based on the data received from other CAD systems.	2			
IV001	The In-Vehicle Reporting subsystem shall be an integrated unit providing vehicle position reporting to Smartlink in real time and an interface for the driver to use to report status and receive dispatch instructions (units are GPS unit, Mobile Data Terminal, Radio Unit).	2			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
IV001E	Mechanical shock: The In-Vehicle Reporting subsystem shall meet or exceed the shock requirements of MIL-STD-810F, Method 516.5, Procedure I. (e.g. 35 mph head on impact).	2			
IV001G	The In-Vehicle Reporting subsystem shall use Global Positioning System (GPS) technology to acquire its current position accurate to within 30 feet circular error probability (CEP).	2			
IV001M	An in-vehicle mobile data terminal shall be used to display messages from Smartlink and for the driver to use to send status messages to Smartlink.	2			
IV001R	The In-Vehicle Reporting subsystem shall use a wireless radio technology to send position reports to Smartlink and to receive messages from Smartlink.	2			
IV002	The In-Vehicle Reporting subsystem shall be configurable to report position in increments of time (seconds) or by distance traveled (fractions of a mile to several miles).	2			
IV002E	Solar radiation: The In-Vehicle Reporting subsystem shall meet or exceed the requirements of MIL-STD-810F, Method 505.4, Procedure I, Cycle A2.	2			
IV002G	The GPS unit shall be able to receive a minimum of 12 satellites (channels).	2			
IV002M	The mobile data terminal shall weigh less than 5 pounds exclusive of any docking station or mounting hardware.	2			
IV002R	The data radio shall use an omni-directional antenna such that the received signal strength shall not deviate more than 20% regardless of the heading of the vehicle.	2			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
IV003	The In-Vehicle Reporting subsystem shall remain operational for a minimum of 5 minutes after the IMAP vehicle is shut down in order to report the vehicle position when it shut down.	2			
IV003E	Wind and Rain: Externally mounted components shall meet or exceed the requirements of MIL-STD-810F, Method 506.4, Procedure I, Cycle A2. (e.g. Sustained wind and windblown rain of 120 mph with gusts to 135 mph).	2			
IV003G	The GPS unit shall include the antenna, mounting hardware and wiring for power and to interface with the mobile data terminal and the radio unit(s).	2			
IV003G1	The GPS unit installation kit shall include material to protect the cables/wiring from damage due to impact, wear or snagging.	2			
IV003M	The mobile data terminal shall not exceed a volume of 200 cubic inches (length x width x depth).	2			
IV003R	The data radio shall not be affected by out-of-band transmissions that include transmissions from trunked radios, EVDO cellular radios and 802.11x wireless radios.	2			
IV004	The In-Vehicle Reporting subsystem shall have a mechanism to prevent it from draining the vehicle battery if the vehicle is off for an extended period of time.	2			
IV004E	Vibration: The In-Vehicle Reporting subsystem shall meet or exceed the requirements MIL-STD-810F, Method 514.5, Procedure I, Category 20, Table 514.5C-VII and Figure 514.5C-1 while operating with no failures. (e.g. random vibration from 20 Hz to 1,000 Hz.)	2			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
IV004G	The GPS receiver shall provide the following information: <ul style="list-style-type: none"> • A unique identifier • Latitude • Longitude • Heading • Speed 	2			
IV004M	The mobile data terminal display shall be readable by the driver in all lighting conditions during normal operations.	2			
IV004M1	The mobile data terminal display shall have a dimming feature such that it can be readable at night without diminishing the driver's view of the road.	2			
IV005	The In-Vehicle Reporting subsystem shall minimize the work effort required by the driver to report status or events (e.g. traffic incidents).	2			
IV005E	Operating Temperature: The In-Vehicle Reporting subsystem shall meet or exceed the requirements MIL-STD-810F, Method 501.4, Procedure II and Method 502.4, procedure II. (e.g. 140degrees F to -4 degrees F)	2			
IV005M	The MDT shall have a minimum of 6 programmable soft keys on the control panel that can be used to provide one-touch functionality.	2			
IV006	The In-Vehicle Reporting subsystem shall report position to Smartlink in latitude and longitude in micro-degrees to six place accuracy within 5 seconds of receipt of its position from the GPS receiver unit.	2			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
IV006E	Storage Temperature: The In-Vehicle Reporting subsystem shall meet or exceed the requirements MIL-STD-810F, Method 501.4, Procedure I and Method 502.4, procedure I. (e.g. 167 degrees F to – 40 degrees F).	2			
IV006M	The MDT shall have the ability for the driver to enter an identification number for a specific driver and be able to store the vehicle identification number entered by the NCDOT.	2			
IV006M1	A card swipe reader or similar technology shall be provided to allow the driver to easily log into the In-Vehicle Reporting subsystem.	2			
IV006M2	The log-in time, the time the vehicle is started and stopped and the driver status (in route to patrol, lunch break, return to base, refueling, etc.) shall be reported by the subsystem to Smartlink.	2			
IV007	The In-Vehicle Reporting subsystem shall be hardened for use in a commercial truck in all weather conditions that can be expected in North Carolina.	2			
IV007E	Humidity: The In-Vehicle Reporting subsystem shall meet or exceed the requirements MIL-STD-810F, Method 501.4, Procedure I and Method 507.4, Figure 1.	2			
IV008	The in-vehicle components shall not obstruct the driver's view of the road in all directions and shall not interfere with the safe operation of the vehicle.	2			
IV008E	Thermal Shock: The In-Vehicle Reporting subsystem shall meet or exceed the requirements MIL-STD-810F, Method 503.4, Procedure I.	2			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
IV009	The In-Vehicle Reporting subsystem components shall be capable of being installed and operate in the following vehicles:Quantity TBD -2008 Ford F-250	2			
IV009E	Electromagnetic Compatibility: The In-Vehicle Reporting subsystem shall have no data loss, resets, reboots, or damage resulting from contact discharge with externally accessible electrically conductive point with 8 KV per EN50082-2 or IEC Standard Publication 801-2/84 Class 4.	2			
IV010	The installed In-Vehicle Reporting subsystem components shall not interfere with the operation of any of the vehicle's equipment to include seats, doors, rear view mirrors, sun shades, etc.).	2			
IV010E	Dust/Sand: The In-Vehicle Reporting subsystem shall meet or exceed the requirements MIL-STD-810F, Method 510.4, Procedure 1 and Procedure 2.	2			
MA001	The IMAP Dispatch Subsystem shall support the acquisition of AVL data and the display of an analysis of the data in the form of icons placed in the correct geographic position on the Smartlink map.	3			
MA001A	The AVL component of the IMAP Dispatch subsystem shall acquire vehicle information containing position coordinates in XML format originated external to Smartlink.	3			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
MA001V	The AVL subsystem shall support management of IMAP contract responsibilities through geo-fences using the Smartlink map and vehicle position reports.	2			
MA001V1	If a vehicle leaves the geo-fenced area without justification, the system shall alert the operator with a popup notification and an audible alarm.	2			
MA002	All vehicle location status data received shall be logged to the database for reporting purposes.	3			
MA002A	The AVL component shall be able to acquire a data file from the IMAP vehicle's Mobile Data Terminal.	3			
MA002A1	The AVL component shall store vehicle position data by vehicle so that the vehicle's track can be replayed on the Smartlink map.	3			
MA002V	If a vehicle is assigned to a beat which has beat-specific geo-fences defined, then the AVL system shall use only the geo-fences for the specified beat to assess whether or not a given vehicle has left its beat zone.	2			
MA003	The IMAP Dispatch subsystem shall support the generation of a report about vehicle position time line with vehicle status information that was associated with the date-time of each position report.	3			
MA003A	The AVL component shall convert Latitude and Longitude coordinates into a text description of the road the vehicle is on and if within 50 yards of a cross street, provide the name of the cross street as well.	3			
MA003A1	The location of the IMAP vehicle relative to the cross street if named will be either at, before or beyond.	3			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
MA003V	The AVL system shall provide a graphical user interface to define the geo-fences, both system-wide geo-fences and beat specific geo-fences.	2			
MA004	The Smartlink IMAP Interface shall support the performance measures data collection of Incident Management Assistance Patrols.	3			
MA004A	The AVL component shall display vehicle position for vehicles logged on using icons on the Smartlink Map.	3			
MA005	Smartlink shall maintain a database of event data reported by the IMAP service.	3			
MA005A	AVL component shall display vehicle status that is provided by the AVL data feed from the vehicle.	3			
MA006	Smartlink shall automatically update the IMAP database with information received from the IMAP vehicles.	3			
MA006A	The AVL component shall update the vehicle status each time a new status is reported for the vehicle.	3			
MA007	If a driver is stopped for a configurable length of time without accounting for the stop, the system shall notify the operator.	2			
MA007A	The IMAP Dispatch subsystem shall store vehicle location and speed history in the Smartlink database.	3			
MA008	The AVL subsystem shall provide the capability to manage IMAP assets according to geographic areas that define their patrol areas, called "geo-fences".	2			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
MA008A	Smartlink shall support the creation of events reported by the IMAP patrols that contain the following data fields: <ul style="list-style-type: none"> • Responder, • County, • Detect Time, • Dispatch Time, • Arrival Time, • License number of the vehicle being serviced, • License State, • Vehicle Type, • IMAP Route, • Direction of travel, • Mile Marker, • Incident Type, • Lanes Blocked, • Lanes Available, • Time Lanes Reopened, • Services Provided, • Depart Time, • How Incident Detected 	3			
MA008A1	It shall be able to enter the following VEHICLE TYPE: <ol style="list-style-type: none"> 1. Passenger 2. Pick-Up 3. RV/Van/Bus 4. Single Unit Truck 5. Tractor-Trailer 6. Motorcycle 7. Sport Utility Vehicle 8. Other 	3			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
MA008A2	It shall be able to enter the following INCIDENT TYPE: 1. Vehicle Accident 2. Fire 3. Disabled Vehicle in Roadway 4. Disabled Vehicle out of Roadway 5. Abandoned Vehicle 6. Debris in Roadway - Rocks, spills (non-HAZMAT) 7. Hazmat 8. Planned Event 9. HAZMAT(non-vehicle accident) 10. N/A (TOC only) 11. Maintenance 12. Debris out of Roadway, 13. Vandalized, 14. Accident PI/F, 15. Assist other Agencies 16. Standing Water 17. Other	3			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
MA008A3	It shall be able to enter the following SERVICES PROVIDED: 1. Extinguish Fire 2. First Aid 3. Tagged Vehicle 4. Removed Debris 5. Pushed or Pulled 6. Traffic Control Only 7. Tire 8. Fuel 9. Fluids 10. Assisted other Unit 11. Mechanical Assist 12. Jump Start 13. Called Wrecker 14. Secured Load 15. Called for Assistance 16. Directions 17. Transported 18. Unable to Locate 19. No Assistance 20. Cancelled En Route, 21. Called Maintenance 22. Incomplete (w/Depart time) 23. Other	3			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
MA008A4	It shall be able to enter HOW INCIDENT WAS DETECTED using the following choices. 1. Law Enforcement 2. IMAP 3. Video Surveillance 4. Incident Detection System 5. Commercial Traffic info Providers 6. Other NCDOT Personnel 7. Other (please specify in comments)	3			
MA009	The AVL subsystem shall allow Smartlink system administrators to associate specific IMAP vehicles and their In-Vehicle Reporting subsystem to specific Smartlink TMCs.	2			
MA010	The Smartlink operator shall be able to use Smartlink to exchange data with IMAP In-Vehicle Reporting Subsystems using the wireless data radio technology used by the In-Vehicle Reporting Subsystem.	2			
MM001	When Smartlink detects a failure of an ITS device, it shall indicate on the Smartlink GUI that the device has failed so the operator can take action.	2			
MM001E	The e-mail shall contain all the information about that device that is available through Smartlink.	2			
MM002	Smartlink operators shall be able to send an e-mail notification to designated maintenance personnel by clicking a radio button on the detailed status display for a specific device.	2			
MM003	The frequency of query shall be programmable at the administrator level.	2			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
QM001	The Quality Monitor subsystem shall be able to generate reports based on data saved.	1			
QM001A	Saved data shall be read only.	1			
QM001C	The Quality Monitor subsystem shall be able to, automatically to the maximum extent possible, monitor and report availability of the Center-to-Center communications link.	1			
QM001C1	The Quality Monitor subsystem shall be able to report which side of the C2C link failed and the location that failed if it is not internal to the Smartlink site.	1			
QM002	The Quality Monitor subsystem shall provide remote access and alerting for Smartlink hardware to include, as a minimum: <ul style="list-style-type: none"> • Server and network health • Disk status • Application status • Usage Warnings (i.e. system responsiveness slowing down, responsiveness beyond set limits, etc.) • Software performance to include at a minimum failures at the subsystem level and latency that exceeds a set threshold. 	1			
QM002A	The Quality Monitor subsystem shall time stamp data to the nearest tenth second to indicate when the data was moved to the database.	1			
QM002C	The Quality Monitor subsystem shall be able to send e-mails to a list of people to be notified for alerting purposes.	1			
QM002C1	The Quality Monitor subsystem shall use a notification list that is tiered based on the severity of the problem being reported.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
QM002C2	A tiered notification list is a list of people to be notified based on the severity of the problem.	1			
QM003	The Quality Monitor subsystem shall provide the ability to view the current and past performance of the system through a secure web site.	1			
QM003C	The Quality Monitor subsystem shall categorize problems according to the severity of the problem.	1			
QM003C1	Problems shall be categorized by three levels of severity where level 1 is most severe and level 3 is least severe.	1			
QM003C2	At a minimum, these Smartlink failures (others may be added) shall be assigned to severity levels as follows: <ul style="list-style-type: none"> • A complete failure of a Smartlink component shall be categorized as severity level 1 • A latency that exceeds a threshold value set by an administrator shall be categorized as level 2 • A hardware or software failure that is automatically rectified shall be categorized as level 3. 	1			
QM003C3	The definition and assignment of Smartlink failures to categories shall be editable by a system administrator without having to stop and restart Smartlink.	1			
QM004	The Quality Monitor subsystem shall provide the ability to see a graphical representation of the system status and latency on any desktop computer with access to the Internet.	1			
QM005	The Quality Monitor subsystem shall provide information used to analyze problems and explain why they occurred.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
QM006	The Quality Monitor subsystem shall be synchronized to a universal time standard.	1			
QM007	Smartlink data shall be saved and time stamped by the Quality Monitor subsystem.	1			
RP001	Smartlink shall calculate and report performance measures that, at a minimum, include data collection throughput, system response time at specific user stations for specific operations and measurement of service availability (mean time between failure, mean time to repair and mean time between incidents).	2			
RP001P	Smartlink shall calculate and store a verification time for each incident by subtracting the time when an incident is confirmed from the time when the Smartlink center was notified.	2			
RP001R	Smartlink operators shall be able to filter by incidents for the purposes of generating performance measures reports	2			
RP001R1	The Smartlink operator shall have at least three ways to select an incident for filtering: (1) by typing in the incident number directly; or (2) selecting from the list of active incidents, or (3) selecting from a filtered list of all incidents.	2			
RP001R2	The operator shall be able to filter incidents by month, location, type, blockage, how reported, responder or responding agency involved.	2			
RP001R3	Smartlink shall be able to generate a report listing the number of incident detections by device type over a Smartlink operator specified date-time period.	2			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
RP001R4	Smartlink shall be able to sort the incidents by level of incident severity.	2			
RP002	Smartlink shall collect information and use it to calculate performance measures.	2			
RP002P	Smartlink shall calculate and store a notification time for each incident by taking the time that the Smartlink center was notified and subtracting from it the time the Highway Patrol, TIMS or NCDOT is notified of an incident.	2			
RP002R	The reporting function shall retrieve IMAP data based on a date/time range and a particular vehicle selected by the operator.	3			
RP003	Smartlink reporting subsystem shall be able to generate reports on how an incident was managed.	1			
RP003P	Smartlink shall calculate the total incident duration time defined as the difference in time from when TIMS, State Highway Patrol or Smartlink is notified until the travel lanes are cleared and associate it with the incident.	2			
RP003R	The reporting function shall be able to generate an IMAP report by driver, by vehicle, by date/time span of the time on duty, the on duty time, the time the operator went off duty.	3			
RP004P	Smartlink shall calculate the rate that secondary incidents occur over a date-time period specified by the Smartlink operator for specified roadway segments or for the entire Division.	2			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
RP004P1	The reduction in rate of secondary crashes performance measure shall be: Rate of Secondary Crashes = (Number of Secondary Crashes for a Date-Time period X 1,000,000) / (Total Vehicle Volume for a Date-Time period X Road Segment Length in miles).	2			
RP005P	Smartlink shall track the primary way in which an incident was detected and associate that information with the incident for performance measure reporting.	2			
RP005P1	Detection methods to be recorded by Smartlink are but not limited to: by surveillance camera (CCTV), speed detector (by type), IMAP stop, SHP notification, and TIMS.	2			
RP006P	For performance measures purposes, Smartlink shall calculate Vehicle Miles Traveled (VMT) expressed as million vehicle miles for any date-time period specified by the person requesting a performance measures report from Smartlink that deals with VMT.	2			
RP006P1	For the volumes needed to calculate vehicle miles traveled (VMT) for presenting crash statistics, Smartlink shall use the volume from detectors multiplied by the segment length.	2			
RP007P	Smartlink shall calculate the Response Time for each confirmed incident by subtracting the date/time of Smartlink incident verification from the date/time that law enforcement or IMAP arrives on-scene. Response Time = time responder on-scene - time verified.	2			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
RP008P	Smartlink shall calculate the Verification Time for each incident by subtracting the date/time of Smartlink incident verification from the date/time that Smartlink was notified of the incident. Verification Time = time verified - time notified.	2			
RP009P	Smartlink shall calculate the Notification Time for each incident by subtracting the date/time of Smartlink incident notification from the date/time that authorities logged the incident. Notification Time = time notified - time reported.	2			
RP010P	Smartlink shall calculate the Clearance Time for each incident by subtracting the date/time of Smartlink incident clearance from the date/time that responders arrived on scene. Clearance Time = time cleared - time responder arrived.	2			
RW001	The NTCIP standard for environmental sensor stations (ESS) shall be utilized for the RWIS interface communications.	1			
RW001H	The RWIS interface function shall implement SNMP over UDP/IP to communicate to NTCIP RWIS devices.	1			
RW002	The RWIS interface function shall provide protocol software to communicate with RWIS field units using NTCIP protocol.	1			
RW002H	The RWIS interface function shall implement the NTCIP Object identifiers (OID) necessary to implement the functionality that is to be provided to the user through the Graphical User Interface.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
RW003	For RWIS elements within the system that do not support NTCIP, control of these devices shall be supported through device drivers that can be selectively loaded and unloaded by the system's interface application on an as-needed basis and that provide functionality equal to that provided via NTCIP-mandatory objects.	1			
RW003H	RWIS shall support an interface to Nu-Metrics fog detectors.	1			
RW004	The RWIS devices shall be able to be accessed and controlled through the Smartlink graphical user interface.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
RW005	Smartlink shall be able to collect the following data elements from RWIS field units that support the data interface: <ul style="list-style-type: none"> • Name; • Location; • Data age; • Air temperature; • Dew point temperature; • Relative humidity; • Precipitation type • Precipitation intensity; • Precipitation rate; • Precipitation accumulation; • Visibility; • Average wind speed; • Wind gust speed; • Wind direction; • Surface sensor name; • Surface temperature; • Freeze point; • Chemical factor; • Chemical percent; and • Ice percent 	1			
RW006	It shall be possible to designate specific RWIS devices and set up Smartlink alerts based on certain data fields specified by the operator crossing threshold values that are programmable.	1			
S001	Smartlink external interfaces shall adhere to published Interface Control Documents.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
S002	Smartlink shall provide for a centrally managed set of software modules that completely support all functionality of the NCDOT Divisions, the Transportation Management Centers, outside entities and NCDOT Managers.	1			
S003	Smartlink shall consist of non-proprietary software (object and source code) wherever possible.	1			
S004	Smartlink shall be capable of running in a clustered database configuration.	1			
S005	Smartlink shall have an executive function that handles all monitoring and reporting of the status of external devices and internal processes.	1			
S006	Smartlink shall support the creation of reports by authorized users.	1			
S008	Smartlink shall support the automation of system support tasks through the use of user modifiable scripts for the following functions: <ul style="list-style-type: none"> • System scheduler • System backup • Data archiving • Maintenance of system integrity • Data links to other NCDOT computer systems 	1			
S009	Smartlink shall authenticate users by accessing the North Carolina Identify Management Service (NCID) as part of a log in process.	1			
S010	Smartlink shall be able to control a video wall from a Smartlink workstation either by providing access to video control software or controlling the video switches that route video to a video wall.	1			
S011	Smartlink shall provide a GIS interface that can import and display shape file data.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
S012	Smartlink shall interface with ITS devices using device drivers or vendor control software to facilitate adding different makes and models of ITS devices.	1			
S014	Smartlink shall be provided with a complete documentation package that shall include, but not be limited to, detailed functional and interface description, user/operator manuals, software standards manuals, training material, software test plans and procedures, and all other documentation required to complete the Smartlink project.	1			
S015	All hardware and software units, components or subsystems shall be tested to verify they meet the specified requirements prior to statewide deployment.	1			
S016	Smartlink shall provide full functionality through a network using hardware or software or combination of hardware and software firewall(s).	1			
S017	Smartlink shall adhere to open architecture standards.	1			
S018	Smartlink shall have an operational availability annually of at least 99% over an operating cycle of 24 hours starting at midnight, seven days per week, for any contiguous 365-day period, excluding periods when modular or source data systems are down or for regularly scheduled maintenance periods.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
S019	Before any software development begins, off-the-shelf software that will serve to be the foundation of the Smartlink system shall be documented to establish a baseline for configuration management of what software is developed specifically for the Smartlink project including what software is modified and to what degree it has been modified for the project.	1			
S020	Smartlink shall compose and automatically send messages to DMS that inform drivers of the average travel time or delay based on the speed limit between two points on the instrumented and monitored roadway system defined by each Division.	2			
S021	Smartlink shall support the addition of new functionality by third party developers using an open architecture approach that conforms to the current North Carolina Statewide Technical Architecture (STA).	1			
S022	Smartlink shall support the acquisition of automatic vehicle location (AVL) data and display the position of each vehicle that data is received from in the form of icons on the Smartlink map.	3			
S023	For each Smartlink component that may require configuration updates after initial installation of the software in the database or an XML file, an Administrative Editor shall be available to facilitate configuration changes.	1			
S024	New data shall be available in Smartlink in 60 seconds or less from when it was entered by an operator or received by an automated feed.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
S026	Smartlink shall integrate the control and operation of NCDOT's existing ITS devices to manage incidents.	1			
S027	Smartlink shall integrate a minimum of 600 portable and permanently mounted dynamic message signs (DMS)	1			
S028	Smartlink shall be able to control and monitor a minimum of 1,000 CCTV cameras.	1			
S029	Smartlink shall be able to control the selection of CCTV video to allow selective viewing.	1			
S030	Smartlink shall interface with traffic detection devices and services.	2			
S031	Smartlink shall collect data to support the reporting of performance measures.	1			
S033	Smartlink shall be able to receive and use data from Road Weather Information Systems (RWIS)	3			
S034	Smartlink shall be able to compose messages and send them to Highway Advisory Radio systems (HARS)	3			
S035	Smartlink shall provide a graphical user interface using a base geographical information system (GIS) database map.	1			
S036	Smartlink shall use a relational database.	1			
S037	Smartlink shall interface with a commercial weather information service and integrate the regional and local weather data.	3			
S038	Smartlink shall manage the distribution of video images to outside agencies	3			
S041	Smartlink shall provide center to field and center to center communication using NTCIP.	1			
S042	Smartlink shall provide secure access from locations outside of where Smartlink is installed.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
S043	Smartlink shall be able to communicate through fiber optic communications, DSL, cable modem, dial up modem, and radio communication links provided by NCDOT.	1			
S044	Smartlink shall synchronize all servers/workstations to a Master Clock signal obtained from a universal time standard obtained through the NCDOT-M&S network.	1			
S045	Smartlink shall provide a redundant system with automatic failover to backup within 30 seconds of initial failure detection.	1			
S046	Smartlink shall support a secure remote access for administration and maintenance.	1			
S047	Smartlink shall periodically query ITS Devices to obtain device status and make it available to display it to the operator.	2			
S048	Smartlink shall comply with NCDOT Strategic Deployment Plan Architecture and the National ITS Architecture	1			
S049	Smartlink architecture shall be modular such that it is able to accommodate ITS devices not currently deployed in North Carolina but that may be added in the future.	1			
S050	Smartlink shall operate normally in a sheltered environment with a controlled temperature ranging from 60 degrees Fahrenheit (° F) to 90° F, and a non-condensing humidity ranging from 30 percent to 80 percent.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
S051	Smartlink shall be interoperable with non-NCDOT facilities that include: <ul style="list-style-type: none"> • Media partners (TV stations, Traffic.com, Trafficland) • SpeedInfo Inc. server • Traffic.com • Inrix • County and State Emergency Management facilities • Emergency Information Center (EIC) • City Transportation Department (Cary, Charlotte, Durham, Greensboro, Hickory, High Point, Raleigh, Salisbury, Wilmington, Winston-Salem, Fayetteville, Burlington, Rocky Mount, and Gastonia) facilities • Law Enforcement command and dispatch centers 	2			
S052	Smartlink shall interface with the existing NCDOT Traveler Information Management System (TIMS)	1			
S053	Smartlink shall acquire North Carolina State Highway Patrol Computer Aided Dispatch incident information through TIMS.	3			
S054	Smartlink shall provide the ability to collect data from and dispatch Incident Management Assistance Patrol (IMAP) vehicles.	3			
S055	Smartlink shall provide a web version through secure access that displays the same information available to the Smartlink operator.	1			
S056	Smartlink shall provide access to the system and data that supports the management of the system's quality.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
S057	Smartlink shall integrate the existing www.nsmartlink.org and TIMS web sites and also incorporate data originated by Smartlink to provide a secure web site.	1			
S058	Smartlink centers shall exchange data and control other site's ITS field devices using Center-to-Center communications	1			
S059	Smartlink shall be responsive to real time demands for information with no periods of display latency exceeding 10 seconds.	1			
S060	Smartlink shall be provided with training in the operation and maintenance of the system that includes at a minimum; <ul style="list-style-type: none"> • system activation • system configuration • normal system operation • abnormal system operation • system administration 	1			
S061	Smartlink shall not degrade or remove any functionality currently in place at NCDOT facilities.	1			
S062	Smartlinklite shall be able to be loaded onto and operated from a single server or PC including a laptop computer.	1			
S063	During any given 24 hour period, there shall be no more than 1 service interruption per day, of up to 15 minutes.	1			
SM001	As a minimum, the System Manager function shall provide: <ul style="list-style-type: none"> • Process initiation/termination • Process status and monitoring • Error logging 	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
SM001A	The System Manager Authentication component function shall utilize NCID to verify the Smartlink operator's access to Smartlink but access to the subsystems of Smartlink such as the DMS subsystem, the CCTV subsystem, etc. shall be maintained locally by Smartlink.	1			
SM001D	The System Manager function shall provide a hierarchical view of the system allowing the user to drill down from a subsystem level to an individual component level.	1			
SM001F	In the case of a failure, the System Manager function shall start processes in the same order that they originally started.	1			
SM001L	The System Manager function shall log every message sent to a DMS or HAR and shall identify which device it was sent to, the time it was sent and the time the message was removed from the device.	1			
SM001M	Monitoring shall include pertinent system information, such as the current system state, as well as historical information, such as system performance, uptime, and error logs.	1			
SM001N	All event notifications shall be stored in the database and tagged with the system date/time to the nearest second.	1			
SM002	The System Manager function shall be capable of automatic (scheduled) and manual initiation, termination, and re-initiation of system processes.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
SM002A	When an operator uses Center-to-Center to access a remote Smartlink's subsystems, the NCID shall be used by the remote Smartlink to authenticate the operator's access to Smartlink at the remote site.	1			
SM002D	<p>through the NCDOT's networks and perform the following:</p> <ul style="list-style-type: none"> • Poll the device on a periodic basis as specified in the database and retrieve device status. • Check the cyclic redundancy check of the device operating parameters and message library against the cyclic redundancy check parameters of the database, • Download operating parameters. • Upload the current operating parameters and display on user's workstation. • Display all database parameters and attributes on the user's workstation as appropriate to the device. • All uploaded information from the device shall be displayed at the user's workstation, • The operator, with appropriate permissions shall be able to display/change database messages and parameters. • A log of all changes shall be maintained by time and operator identification. • Provide a device test mode set of commands. • Provide a method for restricted access to selected devices based upon incident management criteria. • Provide a log of all communications events to and from the device, including the report of device errors. • Provide the capability to stop and restart the device driver via operator control. • Set or check the date and time. 	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
SM002F	In the case of a process failure due to unavailable resources, the System Manager function shall have safeguards to prevent the unrestrained cyclical restart of failed applications.	1			
SM002M	All information collected shall be stored in the database.	1			
SM002N	Event notifications, including alarms, shall be sent to a configurable list of people through a primary and secondary contact medium including electronic mail, telephone, and pager.	1			
SM002N1	The contact list shall be tailored to the event or alarm.	1			
SM003	The System Manager function shall read scheduled process control from the database.	1			
SM003F	It shall be possible to configure the maximum number of retries that the System Manager function shall perform when attempting to restart a failed application.	1			
SM003F1	It shall also be possible to configure the number of minutes over which the retry counter is maintained.	1			
SM003M	The System Manager function shall log error conditions as they are detected.	1			
SM003M1	The amount of data logged for an error condition shall be able to be adjusted in real-time by the operator through the GUI without having to restart the application.	1			
SM003M10	Operator and administrator actions shall be tracked in action log files.	1			
SM003M11	The log file shall list each newly posted DMS/HAR message, the corresponding DMS/HAR' involved, and a time/date timestamp accurate to the nearest second.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
SM003M2	Separate log files shall be used for each application monitored.	1			
SM003M3	Each log file message shall be time stamped and shall provide some indication as to the origin of the message (i.e., what process reported or detected the error).	1			
SM003M4	The System Manager function shall support queries across multiple log files.	1			
SM003M5	The System Manager function shall delete log files when they age beyond a configurable number of days.	1			
SM003M6	The error log shall describe any errors that occurred during the data import process (automated data gathered by sensors along the roadway links) with a time/date timestamp accurate to the nearest second indicating when the error occurred.	1			
SM003M7	All errors shall be included as part of a continuously viewable "errors list" in the form of an error log.	1			
SM003M8	The error log shall be updated whenever an error occurs.	1			
SM003M9	The System Manager function shall support the review by an operator or observer of Smartlink log files.	1			
SM004	The System Manager function shall notify personnel if an application fails or is restarted if the personnel have registered for notifications.	1			
SM005	The System Manager function shall have the ability to initialize individual components as well as subsystem groups.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
SM006	The System Manager function shall be capable of monitoring, reporting, and displaying the status of all subsystems, subsystem components, and network communications links and components.	1			
SM007	Smartlink shall monitor internal status data concerning its operation and make this information available to the GUI for display to the operator and observers.	1			
SM008	The System Manager function shall communicate with and manage ITS field devices through driver software.	1			
SM009	The System Manager function shall utilize NCID to verify the Smartlink operator's identify for access to the local or remote Smartlink system.	1			
SM010	The ability to enter data into the Smartlink system or alter configuration settings shall be controlled by individual privileges.	1			
SM011	The Smartlink system administrator shall be able to manage the system operation and resolve system performance issues via log file analysis tools provided by Smartlink software.	1			
SM012	The System Manager function shall be able to send event notifications via email and/or pager and/or telephone, as well as visual and audio notifications at the operator workstation.	1			
SM013	Smartlink functionality shall be configurable such that only the necessary software components needed to support particular functions need to be loaded at run time.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
TD001	Smartlink shall provide an interface for the control and operation of individual detection equipment deployed by NCDOT to include but not be limited to: loop detectors, radar based traffic sensors, CCTV based traffic detectors.	1			
TD0011	Smartlink shall acquire speed data, sensor location and status from the Inrix Inc. Server.	1			
TD00111	The following data items are provided by defined TMC (Traffic Message Channel) location coded segments. a. Lat/ long b. Direction of travel c. Speed value d. Travel time based on the speed over the segment e. Average speed – what is typically expected f. Reference speed – free flow; not capped at the posted speed limit	1			
TD00112	Smartlink shall acquire the data in XML files when it is available, nominally it is provided by Inrix every 5 minutes.	1			
TD00113	Smartlink shall smooth the Inrix data to eliminate any spikes in the data received from Inrix.	1			
TD001S	Smartlink shall acquire speed data, sensor location and status from the SpeedInfo Inc. Server.	1			
TD001T	Smartlink shall include a "Travel Time Message template" that is used for DMS messages and can be edited by operators with Smartlink Administrator privileges.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
TD002	Travel Time shall be automatically generated based on data provided by the traffic detection subsystem for instrumented roads that have travel time segments defined for them.	1			
TD002S	Smartlink traffic detection subsystem shall make speed readings and other data that is available from the SpeedInfo devices available to other Smartlink subsystems.	1			
TD002T	Travel time messages shall have a Smartlink Administrator configurable message priority that can be modified by operators with appropriate Smartlink privileges.	1			
TD003	If a detector or set of detectors provides bad or no data for a link, the links on either side shall be used to interpolate the speed, occupancy and volume as appropriate for that link	1			
TD003T	Travel Time shall be determined by dividing the average speed in miles per hour across all lanes into the distance in miles for a defined link of instrumented roadway.	1			
TD003T1	Average speed for a lane of instrumented roadway shall be the instantaneous speed detected for the past 5 minutes divided by the number of speed readings for each lane on an instrumented segment with any speed readings that were in excess of 2 standard deviations of the mean being deleted from the sampled set.	1			
TD003T2	Average speed for all lanes of instrumented roadway shall be the sum of the average lane speed for each lane divided by the number of lanes for the segment of instrumented roadway.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
TD004	If a detector or set of detectors provides bad or no data for a link and the link is an end or starting link, speed, volume, occupancy data (as appropriate) from the next or prior link in the chain shall be used to extrapolate what the missing link data would be.	1			
TD004T	Smartlink shall provide a graphical way for operators at each Smartlink site to specify which links in their instrumented roadways will be used for travel time calculations.	1			
TD004T1	Smartlink segments shall be made up of instrumented roadway links.	1			
TD005T	Smartlink shall display travel time automatically on appropriate DMS as a default message.	1			
TI001	Smartlink shall collect and process the following TIMS data: <ul style="list-style-type: none"> • Incidents that have a significant impact on travel; • Severe, weather-related road conditions; • Emergency notices (evacuations, etc.); • Other special alerts. • Road construction and maintenance notices; 	1			
TI001D	Smartlink shall send incident information that has been modified by a Smartlink operator back to TIMS regardless of whether or not it originated from TIMS or the SHP.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
TI002	Smartlink shall be able to accommodate additional data to be added to the TIMS interface that include but are not limited to:☒-Local traffic and road condition information (secondary state roads and non-state maintained roads);☒-Weather information by region (road weather, forecast and current conditions);☒- Transit and multi-modal travel information;☒- Information from other traveler information services (regional and neighboring states);	1			
TI002D	The Smartlink interface with TIMS shall accommodate every field specified in the TIMS interface Control Document to identify an incident.	1			
TI003	Smartlink shall accept or retrieve geo-spatial data from the TIMS and process the data to integrate it into the Smartlink database.	1			
TI004	Smartlink shall filter incident information such that unmodified TIMS or SHP originated incident information is not shared with TIMS, only non-TIMS or non-SHP originated incident information will be sent to TIMS.	1			
VS001	The Video Switch control function shall include an interface to the Barco/Argus wall controller capable of selecting and displaying multiple graphic displays and video images simultaneously on a video wall.	2			
VS002	The video switch control function shall be integrated into the Smartlink Graphical User Interface for seamless operation of the video wall from a Smartlink workstation.	2			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
VS003	The video switch function shall support a video wall made up of display cubes or individual monitors.	2			
VS004	The video switch function shall support the addition of extra "displays" to enlarge the total display area up to at least 18 display units.	2			
VS005	The video switch function shall, at a minimum, either control the following video wall capabilities or provide access to software that controls video walls: <ul style="list-style-type: none"> • Setup controls (brightness, hue, saturation, etc.) • Display layout (placement and sizing of graphics and video being displayed) • Selection of video and graphical content to be displayed. 	2			
VS006	The video switch function shall support the switching of C2C video sources to a Barco Video Wall.	2			
VS007	The video switch function shall be able to control the Pelco video switch.	2			
VS008	The video switch function shall be able to aggregate video images from cameras and make them available to the web site subsystem.	2			
VS009	The Video Switch subsystem shall allow the operator to be able to block any camera image from being distributed to the public where supported by the hardware.	2			
WS001	The web site shall provide graphical and text options for navigation.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
WS001D	A web site user shall be allowed the option of viewing CCTV icons only, DMS icons only, or both CCTV and DMS icons on the map.	1			
WS001S	Secure access to the Smartlink Secure web site shall be through the Internet using a VPN provided by NC-ITS.	1			
WS002	Icons used for graphical navigation shall be representative of the data or destination corresponding to the icon. For example a DMS icon should look like a small sign and a camera icon should look like a small camera. An example of a destination might be a sports stadium that would use an icon that looks like a sports stadium or an airport destination that would look like runways on an airport.	1			
WS002D	All data provided to users via the web site shall be time stamped to indicate its freshness.	1			
WS002S	The Smartlink Secure web site shall be accessible through at least the following browsers: Internet Explorer 7 and 8.	1			
WS003	When used in conjunction with a geographical map, web site icons shall be placed on the map in the approximate location of where the physical device exists relative to the map.	1			
WS003D	The web site shall indicate the last date/time the web site was updated with new information.	1			
WS003S	The Smartlink Secure web site shall be secure employing the Secure Sockets Layer cryptographic protocol or the Transport Layer Security cryptographic protocol.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
WS004	When a user places the mouse cursor over a Smartlink icon on the map, Smartlink shall display a “tooltip” status box that shows summary data about the icon.	1			
WS004D	Multiple color-coding options shall be provided to meet the needs of color-blind users.	1			
WS004D1	Choices of larger font sizes shall be user selectable to meet the needs of visually impaired users.	1			
WS004S	The Smartlink Secure web site shall be capable of authenticating operators based on their originating static IP address.	1			
WS004S1	Passwords associated with the operator accounts shall be stored in the NCID.	1			
WS004S2	The Smartlink Secure web site shall prompt the user for a username and password to gain access to the application.	1			
WS004S3	The Smartlink Secure web site session shall only be terminated either through the use of a logout button or an administrator configured idle timeout.	1			
WS004S4	Smartlink operators shall be able to log in to their workstations without Smartlink connectivity to the Statewide IT WAN.	1			
WS005	Smartlink shall allow the user to click on an icon to open a window that provides additional details about the corresponding icon.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
WS005D	Selectable (on/off) map layers shall be utilized to indicate the location of a variety of information/data points, including: <ul style="list-style-type: none"> • Travel times/speeds and/or traffic flow/congestion (Roadway links will be color-coded according to roadway condition.) • Incidents/Events • Roadwork and Other Construction • Lane and Road Closure • Severe weather • CCTV locations - clicking on a CCTV icon will result in a pop-up window appearing in which the current video (either snapshot or streaming) will be displayed along with a time stamp indicating the time the image was captured. • Locations of DMS - clicking on a DMS icon will result in a pop-up window appearing in which the current text on that DMS is displayed. 	1			
WS005S	The Smartlink Secure web site shall make Smartlink data available for access within 30 seconds of when it was entered into Smartlink.	1			
WS006	Smartlink shall assign each type of information to a group and permit the user to select which groups will be displayed.	1			
WS006D	Clicking on any of the icons or other data elements listed above shall result in a pop-up window that displays more detailed information.	1			
WS006S	The Smartlink Secure web site shall refresh automatically at a system configurable interval, with the default set to 60 seconds.	1			
WS007D	Clicking on a CCTV icon shall display the current image for that camera.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
WS007D	The web site shall allow users to select layers of detail to be displayed.	1			
WS007S	The opening page after secure login of the Smartlink Secure web site shall be an incident list page with an option to go to the map based display the Smartlink operators use.	1			
WS007S1	The "incident list" page shall have three sections: active incidents with a lane blockage, active incidents without a lane blockage, and recently inactive incidents.	1			
WS007S2	The recently inactive incidents section shall display all the incidents that were active in the recent past that is a configurable amount of time.	1			
WS007S3	This recently inactive period shall be configurable, with 30 minutes set as the system default.	1			
WS007S4	The active incidents section shall display the following information when available: Record Number / Identifier, the initials of the operator managing the incident, creation timestamp, IMAP dispatched and on-scene, incident type, location description, and description of blocked lanes	1			
WS007S5	The inactive incidents section shall display the following information when available: Record Number / Identifier, the initials of the operator managing the incident, creation timestamp, IMAP dispatched and on-scene, event type, location description, and current status (unresolved, closed, voided, etc.)	1			
WS007S6	Each section of the incidents list page shall use a different background color to easily differentiate the lists.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
WS007S7	For each incident list record, the operator shall have the ability to select the record and view the "Incident Details" page.	1			
WS008	The Smartlink Secure web site shall provide an "Incident Details" page that will display details about a specific incident record.	1			
WS008D	A separate section of the web site shall contain a clickable list of cameras and their locations.	1			
WS008S1	The "incident details" page shall display the following information if available: event record number / identifier, current incident status, record creation time, Smartlink site managing the incident, notifying agency, ID of the primary event if the current record is a secondary incident, incident type, hazmat, fire, rollover, injuries, a list of vehicles involved including color/make/model/state and tag, estimated clearance time, alternate roads, incident location, incident congestion, lane blockage description, and roadway conditions.	1			
WS008S2	The "incident details" page shall display IMAP related information if available that at a minimum includes: <ul style="list-style-type: none"> • an indication that IMAP was dispatched, • IMAP on-scene arrival time, • IMAP departure time, and • activities performed by the IMAP. 	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
WS008S3	The "incident details" page shall display agency response information if available, including: <ul style="list-style-type: none"> • the name of the agency, • whether or not they were notified by the Smartlink center, and • the notification, on-scene, and departed timestamps. 	1			
WS008S4	The "incident details" page shall include a chronology summary section that will display in chronological order: <ul style="list-style-type: none"> • incident status, • who the responder is, • IMAP ID, • location, • blockage, • congestion, and • DMS messages annotated by time/date and sign ID. 	1			
WS008S5	A navigation link to the "incident list" page shall be provided on the "incident details" page.	1			
WS009	The web site shall provide context sensitive help to users who request it.	1			
WS009D	A legend of all illustrations (e.g., color coding of links and icon definitions) shall be available on the same page as the map	1			
WS009S	The Smartlink Secure web site shall take no more than 2 seconds to refresh the "incident list" or "incident details" pages.	1			
WS010	The secure web site shall indicate how current its information is.	1			
WS010D	The web site shall provide travel times for alternative routes specified by NCDOT.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
WS011	All congestion-related roadway information shall be color-coded for ease of understanding by users.	1			
WS011D	For Divisions, STOC or RTMCs that provide a video tour rather than video from user selected CCTV, the web site shall provide a "video tour" option for that Division, STOC or RTMCs on the web site.	1			
WS012	The web site shall be accessible through WAP enabled cell phones or similar PDA type devices.	1			
WS012D	The web site shall provide camera images, at a minimum, as updating JPEG frames with MPEG4 streaming video preferred.	1			
WS013	The web site shall enable users to view a set of active traffic incidents and events that can be filtered according to incident/event severity (i.e. Critical, Important, Routine or all incidents), routes and region/city where they are occurring.	1			
WS013D	The web site shall be able to expand the number of camera videos that is selectable by the user to a minimum of 1,000 CCTVs.	1			
WS014	The web site must have an operational availability annually of at least 99% measured over an operating cycle of 24 hours starting at local midnight.	1			
WS014D	The web site shall provide CCTV icons that show the location of CCTV cameras that can be used to access images from that camera.	1			
WS015	The web site shall be standards based and avoid the use of proprietary applications.	1			
WS015D	The web site shall modify the type of camera images displayed depending on the user's connection speed.	1			

NC Smartlink Compliance Matrix

Req. ID	Requirement	Priority	Fully met	Cannot Meet	Meet with this change to the Requirement
WS017	The web site subsystem shall receive aggregated camera image data from the video switch subsystem for access through the web site.	1			
WS018	The web site shall allow the user to specify the connection speed they are using.	1			
WS019	Under special situations, such as during evacuations, more detailed information, such as evacuation route information (links to information), shall be provided on the web site.	1			
WS020	The web site shall display the current date and time the information was last updated	1			
WS021	The web site shall have an option for a printer friendly version of the currently viewed page.	3			
WS022	Smartlink shall provide a read-only, secure web site application for authorized NCDOT personnel that runs on Windows servers.	1			
WX001	Smartlink shall be able to receive and process geo-located weather information provided automatically from TIMS.	1			
WX002	Weather information shall be able to be associated with specific incidents or areas selected by the operator.	1			
WX003	Smartlink shall make weather information that has the potential to impact travel available to the operator so that the operator can alert drivers along the roads that will be or are impacted by the severe weather.	1			