A Connected Region: Moving Technological Innovations Forward in the NITTEC Region

Developing an Implementation Roadmap for the ATCMTD Grant: Brainstorming Meeting Report

January 31, 2017
200 Delaware Ave, Buffalo, NY 14202

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1. Introduction

Prior to implementing the NITTEC Region Advanced Transportation and Congestion Management Technologies Deployment Program (ATCMTD Program) grant, NITTEC convened a meeting of stakeholders to discuss priorities. The one-day workshop held on January 31st in Buffalo, NY sought to answer the question, *"What do we want out of this grant?"* It provided regional stakeholders the opportunity to review and expand grant goals in order to best support mobility across the region under the new grant vehicle. The meeting included the identification of regional priorities, constraints, current and future projects, and other important elements for consideration as well as next steps for successful grant implementation.

2. Participating Agencies

The following agencies are involved in implementing the ATMCTD grant elements (per the grant application):

Agency		Role (per ATMCTD Grant Application)
	Niagara International Transportation Technology Coalition (NITTEC)	• Co-leads grant efforts with NYSDOT • Coordinates regional activities • Operates 24/7 regional control center • Maintain regional weather system • NITTEC Regional Signals Committee provides continuity in traffic signal mgmt. across region
	New York State Department of Transportation (NYSDOT)	• Co-leads grant efforts with NITTEC • Operates RWIS and Mesonet sites • Operates Integrated Incident Management System (IIMS) • Operates 511NY • Owns regional traffic signals
	Niagara Frontier Transportation Authority (NFTA)	• Transit provider (bus, light rail, and paratransit) for Erie and Niagara Counties • Collects static and real-time (via AVL) operational data
	City of Buffalo	• Operates and maintains arterial traffic signals (currently upgrading legacy controllers and central control software)
	Buffalo and For Erie Public Bridge Authority (PBA)	• Owns and operates the Peace Bridge
	Greater Buffalo Niagara Regional Transportation Council (GBNRTC)	• Conducts corridor planning activities and ICM initiatives
	New York State Thruway Authority (NYSTA)	• Operates RWIS units • Coordinates RW response on highways
	Niagara Falls Bridge Commission (NFBC)	• Owns and operates the Lewiston-Queenston Bridge, the Whirlpool Rapids Bridge and the Rainbow Bridge

3. Other Involved Agencies

While not directly involved in grant program implementation, the following agencies are involved in program elements that impact grant activities (per the grant application):

Agency		Role (per ATMCTD Grant Application)
nyserda Energy. Innovation. Solutions.	New York State Energy Research & Development Authority (NYSERDA)	• Deploying first phase of ICM deployment in Buffalo–Niagara Region (including EcoTrafiX (ETX))
Ontario	Ministry of Transportation Ontario (MTO)	• Owns and operates 511 Canada
U.S. Department of Transportation Federal Highway Administration	U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA)	• Responsible for ATCMTD program

4. Grant Summary

Co-led by NITTEC and NYSDOT, the Niagara Frontier Region was recently awarded a $7.8 million grant under the ATCMTD Program. The USDOT FHWA-funded program is designed to help communities by awarding grants to projects that will use technology to enhance mobility and expand access to opportunity. Through the grant monies and matching funds, NITTEC aims to alleviate the following regional challenges through the deployment of a multi-agency, technology enabled, integrated Regional mobility management system:

- Significant border delays due to high traffic volumes combined with operational and processing constraints at the border crossings.
- Non-commuter passenger cars and trucks creating the major source of traffic at the three primary bridge crossings.
- Economic and social costs resulting from these delays.
- Increasing VMT (specific to freight) in the Region over the past several years.

Grant Objectives
(Outlined in the grant application)

- Improve Border Crossing Performance and Travel Time
- Improve Commercial Vehicle Operations and Safety
- Expand Regional Smart Mobility
- Improve Incident Management
- Provide for Operational Integration within NFTA and with Regional Smart Mobility
- Use Real-time and Forecasted Weather Information for ATM Strategies
- Provide Travelers with Enhanced Real-Time Information
- Enhance Data Collection, Fusion, Distribution and Archiving

The regional mobility management system proposed in the grant seeks to resolve the above mentioned challenges by accomplishing the following four major goals: (1) Balance multi-modal demand at international border crossings, (2) Improve commercial vehicle operations, (3) Extend existing integrated corridor management (ICM) activities, and (4) Create a realistic pilot that deploys near-term technology for Smart Mobility applications in the Buffalo region.

The following technologies were proposed as part of the grant:

- Commercial Vehicle Operator traveler information applications;
- DSRC-based Connected Vehicle technology;
- Enhancements to NYSDOT 511 systems;

- Updates to the region's Advanced Traffic Management System/Corridor Management System, EcoTrafiX (ETX);
- Enhancements to the incident reporting tool, Integrated Incident Management Systems (IIMS);
- Implementation of a new parking management system for the City of Buffalo;
- Traffic signal system upgrades on key corridors; and
- Transit system data integration.

5. Meeting Agenda

The following agenda guided the day's activities.

08:30	Introductions (All)
08:45	Grant Application Overview (Athena Hutchins, NITTEC)
09:00	Meeting ground rules, outcomes and objectives
09:15	Group Exercise #1: Review of proposed ATCMTD objectives and scope
10:15	*Break*
10:30	Group Exercise #2: Defining Core Implementation Elements and Projects
11:30	*Lunch*
12:30	Group Exercise #3: Developing an grant implementation approach
01:30	*Break*
01:45	Group Exercise #4: Next Steps, agency inputs, actions
03:00	Summary of Decisions and Actions
03:15	Wrap-Up

6. Desired Grant Outcomes

Key Takeaways on Grant Outcomes

- Standardize agencies' data for improved corridor-based operations
- Integrate discrete agency data systems for seamless multi-modal corridor travel support
- Provide real-time, actionable traveler information for better decision making
- Improve road weather and incident response through WRTM strategies
- Improve corridor operations and city-level operations of signals and transit systems

To begin, participants were asked what they would like to see achieved from the perspective of their individual agencies and from a Regional viewpoint. The following outcomes were noted:

- **Balance the demand/load** at the four major border crossings. The ability to monitor conditions already exists on most of the crossings. With some upgrades and data interfaces, this grant can improve actionable information about border choices to truckers and passenger vehicle drivers.
- **Broaden reach and effectiveness of communications to truckers.** To ensure that truckers are making the right choices about travel in New York, information has to be provided beyond the boundaries of the State. Reaching this group requires us to think creatively about the mechanisms to reach not only dispatchers but also on-road truckers.

- **Improve emergency parking information to truckers.** This is an area that the agencies in the region can work together to improve. From more electronic availability of emergency parking data to better wayfinding, informing truckers who are on the road about their options during an emergency will be beneficial.
- **Standardize data and performance measurement** across corridor agencies. This grant represents an opportunity to continue efforts to standardize data interfaces and performance measurement across the region (including Canada),
- **Improve regional situational awareness of road conditions.** This grant represents an opportunity to enhance the density and quality of roadside data collection for road conditions and congestion.
- **Improve capabilities to provide actionable information.** This grant represents an opportunity to identify ways to share actionable, timely information to different audiences through different means – be it 511, DMS, third party service providers. The emphasis should be on what the team considers "actionable" information.
- **Support specific improvements to existing traveler information.** This grant should support activities such as better border crossing information on DMS, improved truck route signage, and truck parking guidance especially during emergencies.
- **Identify opportunities for city-level improvements.** Take advantage of opportunities to coordinate with private parking owners to identify available parking across the City of Buffalo and to make traffic signal improvements to priority corridors for both corridor management and transit service reliability.

7. Feedback on Grant Objectives

Eight objectives were specified in the grant application. The group discussed a majority of the objectives for which they provided input. Broadly, there was consensus on the objectives as valid areas of focus for the grant. In addition, the following high-level observations were noted:

- **Funding Streams**. The group needs to establish steady, ongoing funding streams for long term solutions. The grant is "only the beginning", there needs to be a mechanism for O&M after the grant is over.
- **Reliability of Data Agencies**. Agencies should share reliable data to improve data analytics and actionable information and allow third parties to design applications using the data collected.
- **Usefulness to Road User.** Need to create a system that will provide each user the information most useful to them based on who they are and where they are going.
- **Role of DSRC.** As a region, need to decide how we want to address DSRC-related aspects of the grant scope. It is valuable for V2V safety but traveler information can be done without DSRC using cellular or satellite.

Key Takeaways from Discussion of Grant Objectives

- Need for accurate, real-time and predictive information
- Grant should focus on data fusion activities as a primary objective
- Need to reach truckers through the resources they already use
- Need to better define "Regional Smart Mobility" and associated outcomes
- Need to more clearly define/scope out city-level grant elements
- Need to identify what is meant by connected vehicles within the scope of this effort
- Need to have a broader picture of what road condition and event data collection is required in the region and what tools are best suited for this purpose.

The following table summarizes the feedback on each objective. More detailed notes on the objectives are included in the attachment ("Workshop Summary_Raw Notes").

1. Improve Border Crossing Performance and Travel Time

- There are existing projects that are ongoing that will help collect data on border crossing delays. Need to figure out how best to communicate them with users. Might require changes to Variable Message Sign (VMS) policy on how travel times/delays are shared. There are also differences between freight and passenger travel times that needs to be communicated.

2. Improve Commercial Vehicle Operations and Safety

- There is a real need for real-time traffic, parking and weather information to commercial vehicles to facilitate trucks operations from the Pennsylvania border and the Rochester area into Buffalo and the border crossings. Emergency parking in the area needs to be managed as well. However, truckers can be hard to reach. Need to figure out how best to reach them through the sources/services that they use.
- Integration with other freight initiatives/activities that are ongoing in the region is critical. For example, HOOCS is a permitting system that can be leveraged for this grant. There are opportunities with NYSERDA grants on truck platooning which will bring together stakeholders around trucking technology that maybe relevant for concept development efforts for this grant.

3. Expand Regional Smart Mobility

- Need to better define what the outcomes for Smart Mobility are for the grant. Currently, the existing I-190 can serve as a template for expansion to other corridors. However, it is still unclear on whether the grant will advance the I-190 ICM functionally or will expand the geographic scope.
- There are many city-level projects that are needed and can be aided by grant monies including upgrades to signal equipment on key corridors, a potential pilot of a parking availability system.
- Participants also agreed on a regional data fusion tool that integrates various ATMS and external data interfaces for a regional view of mobility. While there are predictive capabilities, it is still unclear on what the nature of the Regional Decision Support System needs to be. Constraints on grant budget do not allow a real-time, predictive DSS.

4. Improve Incident Management

- Participants noted that incident clearance should be a priority- need to get towing done faster, need more resources.
- There are still detection gaps - what is the right way to get notified? CAD integration? Other sources of incident detection.
- Proactive vs. reactive - have historical information, so should be able to do some prediction. Also should use data from HERE and other probe data sources.
- Expansion of the HELP Team – it's on portions of expressways but there are a lot of gaps. The region does have performance metrics in place to show reductions in clearance time. HELP is good to have for minor incidents.
- Participants noted the need for better information on incident response and situational awareness as the biggest issue: Who is out there? Lanes closed? Injuries/fatalities? Do I need to send certain resources? Responders want streaming video.

5. Provide for Operational Integration within NFTA and with Regional Smart Mobility

- Need real-time and predictive data for our dispatchers who are making decisions on weather and incident management events. Need a way to increase bus reliability b/c that will increase ridership.
- Need better Center-to-Center connections between transit and traffic.
- The grant should support continuing improvements on priority corridors (improved info systems, improved TSP, improved data etc.)

- Integrate reliable real-time information into other applications. (Right now have a separate app with low reliability that people don't repeat use).
- Signal communication - Make sure have communication to signals along the corridors that we can collectively identify.

6. Using Real-time and Forecasted Weather Information for ATM Strategies

- Proactive weather and road weather alerts can help but it is contingent on the availability of good data. In New York, the current RWIS network is not in use and needs to be rebuilt. It's unclear how the Mesonet can be integrated into operational information. There might be value in road condition reporting from mobile fleets.

7. Provide Travelers with Enhanced Real-Time Information

- Provide real-time and forecasted multimodal multi-agency transportation network information via 511NY and other applications. It was repeatedly noted that agencies need to focus more on the accuracy and latency of information which can support actionable decision-making on the part of the travelers and less on the mechanisms. There are many outlets for information and the region needs to become the place for good information that is then broadly disseminated.

8. Enhance Data Collection, Fusion, Distribution and Archiving

- This objective was mentioned as one of the most critical elements of the grant. There is a lot of existing data between agencies (and across the border). Creating an integrated view of mobility was mentioned as a vital need not only for agency situational awareness but also for traveler information.

8. Feedback on Strategies and Activities Identified in the Grant

Participants provided feedback on the six overarching, coordinated strategies identified in the grant for deploying the Regional mobility management system. The following table lists the "areas of concern" of each strategy identified during group discussion as well as the "capabilities" explicitly described.

Strategy	Areas of Concern	Existing Capabilities
Expansion of Information Exchange Network (IEN) System (expansion of current NYSERDSA project EcoTrafiX (ETX))	• Nature of Decision Support System (DSS) and relationship to existing ICM activities • Limited volume detection in the corridor may compromise ICM strategies. • Transit data integration is still a work in progress. • O&M costs for the tool including maintenance costs for video sharing - need to make sure to consider how these costs will be shared among agencies after the grant. • Better defining the scope additions to existing ETX implementation project funded by NYSERDA through this grant	• Ongoing NYSERDA project. There is an existing 3rd party interface that allows 3rd parties to request data with justification. NITTEC decides if it is provided. If so, they become data subscribers. • Video sharing – every agency accessing the system online has access to video sharing component.
Streetline Hybrid Smart Parking System	• Unclear on how this will work in Buffalo with limited public lots. There needs to be a parking-related stakeholder meetings to make sure focusing on the right priorities in the right locations. Also need to look at potential tie-ins with the Buffalo Niagara Medical Complex (BNMC) or the University of Buffalo. • Not sure what level of sensor-ization is needed for the system to work	• The proposed system is a flexible system that accepts data from different sources (including video snapshots) to estimate parking availability • Intelligent system that uses historical data and sensors
Integrate RWIS, Mesonet	• The existing RWIS are considered unreliable and not used for decision making	• Ontario – RWIS heavily used for forecasting and decision making

Strategy	Areas of Concern	Existing Capabilities
Road Weather Data	• Concern that we can't generate site-specific forecasts, don't have enough capability along the roadway • Need to broadly consider what proactive management means in this area and what data is needed? Consider (1) data overlay, (2) what to do with data/info and (3) how do we get mobile data sources?	
Develop a CVO Connected Vehicle Concept	• The budget proposed and the approach might be unrealistic. Lack of CV standards for trucks, challenges with available equipment, wiring, create a significant amount of risk to install and operate a CV environment with 500 trucks. • A broader discussion about the region's interest in DSRC-enabled applications is necessary.	• Recently 6 NYSDOT snow plow trucks in region fitted with sensors for mobile information • DSRC at border crossings – may want to use this pilot to see directional and handoff issues.
Incident Information Management System (IIMS) and ETX Integration	• IIMS takes myopic look at data needs on incidents. • Need to look at other events and data sources. More broadly, what do agencies need in terms of situational awareness is still unresolved. • The level of customization of IIMS for the region is still a risk.	• IIMS would be a mobile platform – used in any vehicle to pull incident information. Loaded into system and distributed to other responder communities.
NTCIP-based interface to signal systems	• Unclear on what communication is needed and how the grant efforts will be tied in with broader city-level procurement on signal systems.	• RFP for a central software for signal system currently out from City of Buffalo

9. Identified Risk Factors

The meeting represented an effort to identify potential risks involved in grant implementation. The following risk factors are identified as a starting point.

Technical Risks

- **Proposed scope of Connected Vehicle Technology has a risk of ballooning in budget and complexity of implementation.**
    - Unclear yet if DSRC-based on-board equipment for trucks has been tested and commercially available by vendors. As such, this grant would have to spend a lot of resources in dealing with prototypes based on uncertain standards.
    - The identified CV applications, which are primarily around situational awareness, may be better delivered through non-DSRC channels.
    - The proposal underestimates the challenges of engaging truck fleets to equipping on-board equipment.
- **The ability of IIMS to meet all the needs of field data collection is unclear.** IIMS has been developed over many years and has the capability to provide data collection from the roadside. However, it is unclear what level of enhancements are required to make it work in the Buffalo region. Also, uncertain is the commitment from field users to collect this data. Lastly, there are other aspects of field conditions (road surface conditions, pavement temperatures) etc. which may not be collected through the IIMS system.

- **Proposed role for the DSS in ICM is unclear.** The proposed budget does not account for a real-time, predictive DSS. Consequently, it is likely that the DSS will be a response plan playbook. It is unclear if such a playbook exists in the region. In the absence of existing playbooks that can serve as input for the DSS, the creation of such playbooks can be a complicated endeavor.
- **City-level mobility elements for transit and parking are not well defined** with a high potential for scope creep. It is also unclear how proposed elements in this area tie-in with existing initiatives.
- **Integration with existing legacy systems between operating agencies.** While this is ongoing, it is unclear what still remains to be done and what will be accomplished with the grant.

Operational Risks

- Several of the elements identified in the grant projects require agency-level action on policies or operational procedures. For example:
    - Changing VMS policies to display more refined travel times/delays
    - Policies on third-party usage of data
    - Policy/Decision on DSRC use
- Emergency responders need to be engaged, especially their use of IIMS.
- Need a comprehensive plan that links in existing initiatives more closely with grant elements.

Institutional Risks

- The regional partners need to decide on their expectations for the grant especially the balance between the following two questions:
    - Is this an opportunity to do small scale pilots of concepts? OR
    - Is this an opportunity to bring various proven pieces of technology to full-fledged operations?
- Need agency champions beyond NITTEC to support some of the proposed grant elements (e.g., Thruway, City of Buffalo).
- Better definitions of outcomes and performance measures for the grant are needed during the concept development stage.

10. Gaps and Opportunities

The following bullets illustrate gaps in the proposed solutions which may represent (per the sub-bullets) additional opportunities for the grant.

- **More emphasis on emergency truck parking**
    - Identification of truck parking locations
    - Formalize agreements between agencies on emergency truck parking procedures
    - Integrate with existing park-and-ride databases
- **Broader consideration of Smart Mobility Applications**
    - Implementation of mobility-on-demand (MOD) initiatives (lots of innovative “soft TDM” type strategies around the Medical Center expansion)
    - Consideration of electric-vehicle charging solutions
- **Leveraging the freight telematics industry for reaching truckers**

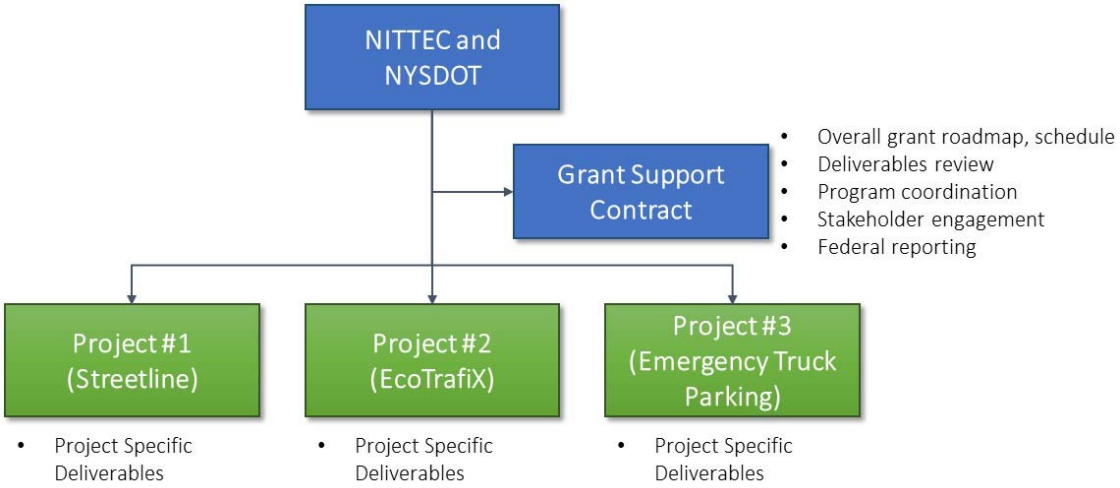
    - Third party integration
    - Working with groups that are looking at platooning as part of NYSERDA
- **Comprehensive assessment of road condition data collection including incidents, weather, construction, and events**
    - What is needed beyond IIMS

11. Potential Implementation Pathways

Four pathways for implementing the proposed grant elements are identified. Each of these approaches have pros and cons associated with them.

Pathway #1 – Project-based implementation

In this pathway, NITTEC and NYSDOT break down the project scope into discretely funded project elements. Each project element will have its own deliverables, schedule and milestones. NITTEC and NYSDOT may also have a Grant Support Contract that keeps the various moving parts in play.

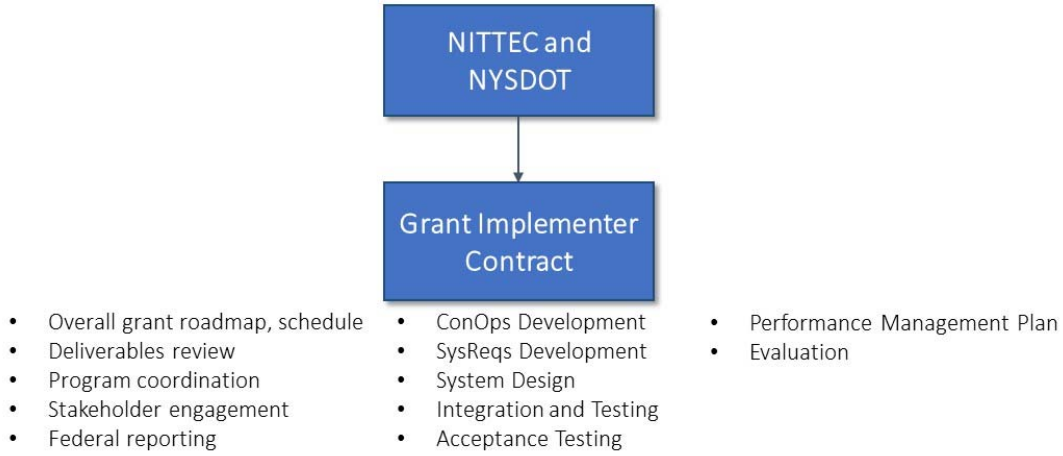


Pros: Discrete project elements that can include an agency champion, specific schedule and delivery. Manageable in terms of project execution. Greater ownership among agency partners.

Cons: NITTEC and NYSDOT have to manage several contracts (scoping, contracts management). Broader system-level integration is harder to achieve unless projects are carefully scoped and monitored.

Pathway #2 – Single Implementer Model

In this pathway, NITTEC and NYSDOT select a single entity to implement the proposed scope of the grant.

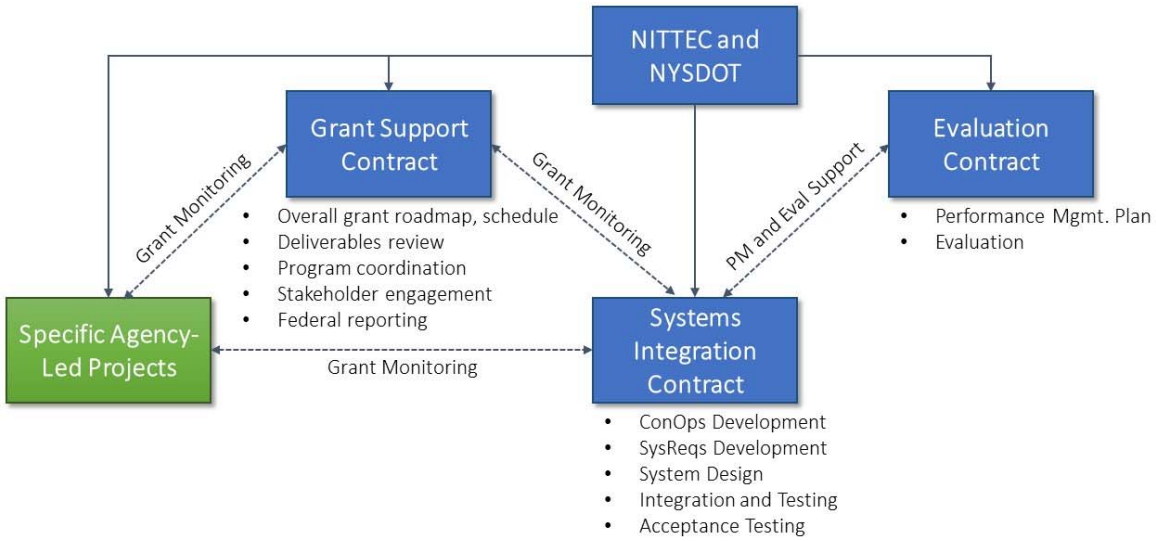


Pros: Single contract to be managed from NITTEC and NYSDOT perspective. Easier schedule and cost management and consequently reporting for federal purposes.

Cons: Limited ownership of projects among participating agencies. Might result in inefficiencies when projects can be assigned directly to an agency. Grant implementer will likely have several project elements in their scope which are beyond their control for successful operations.

Pathway #3 – Functional Support Implementation Model

This pathway identifies functional support needed for the grant and structures the contracts around it. Three separate contracts are needed – Grant Support (help NITTEC oversee and manage the grant), Systems Integration (system engineering capabilities), Evaluation (develop Performance Management and Evaluation Plan). In addition, NITTEC and NYSDOT can identify specific project elements that are best carried forward by an operating agency.



Pros: Clear separation of management and oversight from technical integration services. Model provides support for regional grant elements as well as individual project elements that are best carried out by NITTEC member agencies.

Cons: NITTEC and NYSDOT have multiple contracts to manage. Complex relationships between various contract holders can complicate projects unless there are good working relationships.

Pathway #4 – Go/No-Go Decision Model

This pathway preserves the greatest flexibility for NITTEC and NYSDOT by splitting up the grant implementation into phases with a clear go/no-go decision. In this model, NITTEC and NYSDOT issue a contract only for Phase 1 – Concept Development Stage. At the end of the concept development stage, a Phase 2 contractor is selected.

Pros: Preserves greatest flexibility for NITTEC and NYSDOT given the unknowns in project scope. Allows the focus on better defining needs and concepts before jumping into solution-ing.

Cons: Ability to quickly get Phase 2 contractor is critical. If selection of Phase 2 contractor is delayed overall grant implementation is delayed as well. Phase 1 ConOps development contractor is not working from a blank slate. Rather, they have to respond to the agreement document.

12. Next Steps

The final session of the workshop focused on "next steps" for grant implementation.

Grant Management. The group discussed potential avenues for grant management. Given the difficulties in identifying volunteers to "shepherd projects along" the consensus was to utilize the NITTEC committee structure already in place. The team needs to determine whether any additional agencies need to be included in the committee (beyond those at the workshop today) or whether the team should be smaller. There was a suggestion to have one representative, with the ability to make financial, data, and time commitments/promises from each agency to speak on behalf of their jurisdiction.

Agency Support. When asked what the biggest help to NITTEC would be in support the grant, NITTEC commented having participation from the agencies was critical. While there won't be formal commitments requested, there will be stakeholders meeting and it will be important to have the right people there.

Additional Agencies. The group identified NYSERDA and USDOT/FHWA as stakeholder agencies that should be included in future discussions.

Canadian Support. MTO indicated their commitment to the grant and will provide the necessary resources and time. They did inquire as to the level of funding needed on their end.

Clarity on Grant Program. Questions still loom regarding path forward on the grant. The team indicated over the next few months additional information will be provided after internal scope and budget are worked out. Agencies indicated it would be difficult to commit their personnel to support the grant without a clear idea of what is being delivered.

Memoranda of Understanding (MOUs). There are current MOUs in place among NITTEC member agencies. In order to support policy decisions coming out of this project, there was a suggestion to build on the existing MOUs.