3.0. CORRIDOR STRATEGIC PLAN

3.1. Overall Vision of a Smart Corridor

3.1.1. Overview: A Multipart Corridor with a Common Vision

The I-87 corridor, over 300 miles in length and serving the State’s largest metropolitan area as well as its most isolated natural areas, poses a complex planning problem. Along its length from the New York City area to the US-Canada border near Montreal, it plays a key role for intercity passenger travel and as a trade and commerce corridor. It connects with the important Ports of Montreal and New York and New Jersey at both ends and with key east-west routes like I-90 and I-84. It also serves as a key commuter route and local arterial distributor in areas like the I-87/I-287 segment in Rockland County and in the Capital District. North of the Capital District, I-87 provides the vital link to the low-density areas of the Adirondacks with its many renowned natural and recreational areas and high growth areas like Glens Falls and Plattsburgh. Within the Study’s limits from the Tappan Zee Bridge to the US-Canada border, daily two-way volumes range from roughly 120,000 to 140,000 vehicles per day in the more populated areas (Rockland County, Albany), with the associated commuter period congestion problems, to under 20,000 along the relatively isolated northernmost segments of the Northway.

Given these factors, as the Study Team tried to better understand the corridor’s needs and to prepare it to meet future challenges, it was necessary to view the I-87 corridor as a collection of corridors, serving a wide range of travel markets or “customers.” Some programs or projects developed or supported by the Study (e.g., ITS systems that use the detection of E-ZPass transponders in vehicles to monitor traffic speeds and travel patterns in the corridor) will be more critical to some areas of the corridor than other areas, while other projects (e.g., commercial vehicle operation [CVO] programs for truck freight) are important to the entire corridor. While the Strategic Plan for the corridor reflects this diversity of travel markets and communities along I-87, the Plan gives special attention to those actions that would support the common vision of I-87 as a Smart Corridor.
3.1.2. Development of a Smart Corridor

The I-87 Multimodal Corridor Study began in early 2003 with the development of the Study’s overall goals and objectives, as presented in Section 2.2. From the Study’s initial identification of corridor needs and issues and the development of the “Long List” of improvement concepts in Phase I, and the development and assessment of “Smart Corridor” projects in Phase II, the Study Team has remained focused on these initial goals and objectives. In many ways, these are goals that communities along almost any major corridor in the country would fully support, as they get at the heart of what a transportation network is intended to do. The Smart Corridor theme that has evolved through the Study is not a goal per se but a vision that transcends all of the goals and is the best way to achieve these mobility, economic, safety and security, and quality of life goals. The Strategic Plan essentially identified the best ways for the corridor to develop in this “Smart” manner. The next section organizes this Smart Corridor vision in alignment with the four Smart Concepts that will address the needs of the four primary customer markets identified for the corridor.

3.1.3. Four Smart Concepts and Strategic Steps to Achieve Them

Four individual “Smart” concepts evolved over the course of the Study — Smart Highways, Smart/Safe Traveler, Smart Freight, and Smart Public Transportation. These concepts helped the Study Team organize recommended strategies and programs along travel modes and market lines. The four concepts, and the key strategic elements under each that were developed during Phase II of the Study, are as follows:

**SMART HIGHWAYS.** Traffic volumes along the I-87 corridor, and in the Capital District in particular, have been increasing steadily over the past several decades. CDTC estimates that traffic volumes on the Capital District segment of I-87 will continue to increase at an annualized rate of approximately 1.6 percent, which translates to an increase in daily volumes to approximately 150,000 vehicles by the 25-year planning horizon. This increase in the number of vehicles traveling the corridor is likely to expand the duration of congested operations, as drivers will adjust their trips to other hours of the peak period and eventually into the peak period shoulders, given the constrained conditions that currently exist during the commuter peak hours. The trend of peak spreading could increase the number of hours each day that operate under unstable, saturated conditions. This condition will also exacerbate the effects of bottlenecks or breakdowns in traffic flow and will extend the length of time required for traffic flow to recover from these conditions.

In order to accommodate this growing demand, new strategies, beyond traditional supply-side solutions like increasing capacity along existing routes or building new roads, are being implemented to manage congestion. Nationally and within New York State, strategies for addressing travel congestion are moving away from general-purpose capacity improvements and toward projects to optimize the utilization of the existing available infrastructure. This trend includes the use of state-of-the-art technologies for automated data collection, traffic control and communications to improve incident response, operations management and traveler information systems. The integration of these systems provides real-time, interactive management and operations to better control the use and effectiveness of the transportation system.

New York State has been one of the leaders in the transportation management sector of ITS since the early 1990s, with a focus on improving the overall operation, safety, and reliability of
the State’s transportation network. The State’s current ITS initiatives have evolved out of its earlier programs, including:

- the roll-out of E-ZPass along the Thruway;
- the INFORM program on Long Island, providing a computerized network for informing travelers about travel conditions and routing traffic around congestion;
- TRANSCOM traffic information sharing partnership between New York, New Jersey, and Connecticut in the New York City metropolitan area; and
- New York’s involvement in the I-95 Coalition, a multi-state alliance of transportation agencies, toll authorities, and law enforcement agencies.

New York State uses ITS technologies such as variable message signs and highway advisory radio systems to inform and direct drivers, and the presence of E-ZPass transponders also allows agencies to collect travel time information through the TRANSMIT system to better monitor and manage the highway network.

Within the commercial vehicle sector, there is a strong national trend towards the use of ITS technologies to improve highway safety and freight transport efficiency. These efforts automate driver and vehicle credentialing and the truck inspection processes, and improve enforcement and fleet management. New York has taken the first steps toward integrating CVO with ITS through its deployment of the One Stop Credentialing and Registration (OSCAR) on-line registration program and through its participation in the North American Preclearance and Safety System (NORPASS) program, a public-private partnership dedicated to enhancing commercial vehicle safety and efficiency through the use of electronic screening systems. The use of these ITS and CVO technologies and programs will help bring New York State into compliance with the national CVISN (commercial vehicle information systems and networks) program – a Federally coordinated system (through the Federal Motor Carrier Safety Administration) of state, federal, and private sector information systems and communications networks that fosters the application of ITS technologies to commercial vehicle operations.

The key strategic elements necessary to the evolution of I-87 as a Smart Highway are:

- **Element H-1: Seamless Coordination among Agencies.** NYSDOT’s “Transformation” process is intended to address the independent operating structure of transportation agencies and authorities that historically evolved within the State, including the I-87 Corridor. The intent is to replace this structure with one that integrates these entities into a single, fully coordinated organization, with transportation planning and operations carried out in a more unified and holistic manner. Formation in November 2003 of the New York State Transportation Federation,
corridor-wide planning effort.

- **Element H-2: Creation of Smart Networks.** Travelers faced with congestion on a major highway route generally have very little information when deciding whether to switch to an alternate route. The agencies trying to deal with the same congestion problems may have good information about the traffic accidents or other incidents that caused the problems, but cannot direct travelers to detour routes because there is little or no information about conditions on those routes.

A key step in correcting this situation is to move beyond operating the system as a series of segments to operating it as a series of interdependent smart highway networks, where entities have a comprehensive, real-time knowledge of conditions throughout the entire network. This requires both systems to collect the data for agencies to make the right decisions and methods to get that information to travelers.

- **Element H-3: Support for Transit Modes within Highway Planning.** As agencies begin to plan for ways to meet transportation demands over a 20-30 year horizon, it is becoming clear that these future levels cannot be met by simply adding highway capacity, nor is carpooling likely to be an effective “stand alone” solution. This is particularly true in the rapid-growth suburban and rural areas where much of the population growth and land use sprawl has occurred in recent years and is projected to continue. Effective mass transit infrastructure and operations that can serve these growth areas have to be incorporated into this planning process.

Further, as emphasized in NYSDOT’s Transformation process and incorporated into the New Starts\(^1\) process by the Federal Transit Administration (FTA), the potential for transit modes to succeed in the future depends in part on communities along key travel corridors incorporating land use regulations and incentives that support transit-oriented development near transit lines and stations.

- **Element H-4: Smart Highway Capacity.** One of the primary ways in which highway planning has changed since the 1950s and 1960s is in the area of managed capacity. By limiting access to certain highway lanes in congested areas as a function of time of day and congestion levels, agencies can better manage and control the highway’s capacity while providing preferential access to transit and carpools. The concept can be applied

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\(^1\) FTA’s “New Starts” funding deals with proposals for major new transit investments such as commuter rail, light rail, automated guideway transit, people movers, and exclusive facilities for buses (such as bus rapid transit) and other high occupancy vehicles, which utilize a separate right-of-way. New Starts guidelines call for projects to support “Growth-management policies,” that not only limit sprawl but support “transit oriented development” within growth-management areas. (Source: FTA, *An Interim Guidance Addressing the Major Capital Investment Projects Final Rule* (2004))
to existing highway lanes or in the planning process for future highway corridor expansion.

High-Occupancy Vehicle (HOV) lanes have been in operation across the country since the 1970s, providing preferential treatment on congested urban area highways (typically in commuter rush hours on weekdays) for buses, vans and carpools. The HOT (High Occupancy/ Toll) lane concept adds pricing to the HOV scheme, with the preferential lanes’ entrance tolls generally varied by time of day or by the measured level of congestion in adjacent general purpose lanes. HOT lanes are already in operation in multiple locations in this country and abroad, and are being considered as an integral part of many on-going highway corridor projects. Since they generate their own revenues, HOT lane programs can be self-financing, and can even be constructed and operated by private firms. If fully utilized, traditional HOV lanes can dramatically increase the number of people moved in a given lane. However, they lack the real-time pricing controls that HOT lane operations can provide.

The key within the concept of Smart Highways is to avoid the traditional approach to congestion of simply adding general purpose lanes to meet capacity needs. Instead, capacity should be added first to high-benefit locations, while existing and planned highway capacity should be managed to maximize its person- and vehicle-moving capacity.

SMART PUBLIC TRANSPORTION. Increasing public transit use has historically been a challenge for smaller urban areas due to the lack of population and employment densities needed to sustain such services. Similarly, intercity services with sufficiently regular service to meet the needs of business travelers face the same challenges in a corridor with only one significant urban area (Albany) and many isolated rural areas. At the southern end of the corridor, where the arms of the New York City metropolitan area’s large public transportation system reach out into Westchester, Rockland, Orange, and Putnam counties, public transit use is more prevalent, but primarily oriented to serving Manhattan-bound trips.

Despite the challenges public transit faces in this corridor, it has some surprising and significant success stories and ones which the corridor and its key communities can build upon – for instance, the successful and competitive Empire Corridor passenger rail service, the growth of low-cost airline service into various corridor airports, and the substantial success of the Capital District Transportation Authority (CDTA) operations in the Albany area. The following trends within the public transit sector, both nationally and in the corridor, as well as the population and employment changes that will affect its marketability, are important when considering transit plans in the corridor:
• **Bus Rapid Transit (BRT) Growth.** Due to the significant cost of conventional fixed guideway rail transit systems and their inability to cost-effectively meet the needs of smaller urban and rapid-growth suburban centers, and the significant changes in bus transit technology, BRT is now viewed more readily as a serious long-term transit solution for corridors looking to reduce their dependence on private autos.

• **Continued Growth in Suburban and Exurban Areas.** The trends of the last two decades, with more significant population and employment growth occurring in the suburban and outer-ring small urbanized areas are expected to continue, posing problems for transit operations trying to connect those areas to the rest of the region and reduce traffic growth. The growth patterns in areas like Saratoga County in the Capital District or Orange and Rockland counties in the southern portion of the corridor are classic examples of this pattern.

• **Awareness of Long Term Need for Public Transit with Dedicated Guideways.** Planning studies conducted in New York State and nationwide have determined that simply adding highway lanes will not meet the 20- and 30-year traffic demands projected in those studies. Investment in transit systems, especially those that operate outside congested highway lanes, is being seen as a more effective alternative, from both a mobility and environmental perspective. As a result, New York State’s transportation agencies have begun to integrate transit planning into long term highway corridor planning.

• **Land Use Controls and Transportation.** Transportation agencies and land use planners are becoming increasingly cognizant of the critical linkage between land use and transportation policies. This awareness is evident in several recent State and regional planning efforts, including the emphasis on transit-oriented development in CDTC’s *New Visions* master plan for the Capital District, and the NYSDOT “Transformation” movement's focus on the strong connection between public transportation, sustainable economic growth, and livable communities.

• **Public Awareness of Transit Options Can Increase Usage.** With transportation agencies’ increased customer orientation comes a clear understanding of the need for marketing those services, including the fact that many potential transit customers don’t know about available services to their planned destinations. Programs like the TRIPS 1-2-3’s Transit Advisor web site for travelers in the Greater New York City Metropolitan Area are beginning to provide this kind of information.

• **Low-Cost Commercial Air Carriers.** The continuing growth in low-cost carriers has significantly altered the airline industry, and continues to benefit air travelers. Low-cost, no-frills airlines compete with major airlines by reducing operating costs and concentrating on reliability and good schedules, and comfort and convenience at all levels. Successful low cost airlines are able to drive down the airfares of competing airlines, and give the consumer many options. For example, since Southwest Airlines
entered the Albany market in 2000, fares from Albany have dropped 30 percent overall. However, not all low-cost carriers are successful. Many variables are factored in, such as the quality of service, type of aircraft flown, and the competitor's position in the market. A new low-cost carrier, Independence Air, began scheduled service out of Albany and Burlington in July 2004 and Stewart in September 2004.

- **New Aircraft.** New aircraft technology is also impacting intercity air travel to and from the corridor's airports. For instance, regional jets, small short-range jet aircraft suitable for short hauls between 400 and 800 nautical miles, are replacing traditional narrow-body jets and turboprops for carrying passengers to and from smaller commercial airports such as Albany International. Microjets, which typically have six seats, are expected to be a growing form of transportation in the general aviation industry and, at $1 million, cost significantly less than typical business jets. In addition, light-sport aircraft, which are two-seat, low-performance recreational/personal aircraft, are expected to generate considerable activity at general aviation airports once the FAA publishes its final rule establishing this new category of aircraft and new level of pilot certification. Like the microjet, these new aircraft cost significantly less than their traditional light aircraft counterparts.

With a mixture of smaller-size urban centers, and with its major recent population and employment growth in suburban and “exurban” areas, the I-87 corridor poses a challenge for public transportation operations. The “many-to-many” travel patterns in those areas pose a problem for modes that require more concentrated travel markets to operate efficiently. Achieving the vision of Smart Public Transportation in the corridor will require the following strategic elements:

- **Element P-1: Build on Empire Service Success.** Amtrak’s Empire Service, particularly the portion between New York City and Albany – the busiest part of the Empire High Speed Rail Corridor – is one of nation’s passenger rail success stories. Building on that success – maintaining and expanding service in strong market areas north of Albany, continued infrastructure and rolling stock upgrades, creative marketing of rail services, improving local transit connections to rail stations – can all help this service continue to become a vital link connecting the key economic centers in the corridor.

- **Element P-2: Smart Transit Corridors.**
  - **P-2A: Enhance Existing Routes.** Programs to increase the competitive position of existing transit operations, such as by providing dedicated lanes, signal override
systems along key bus routes or highways, park-and-ride facilities, or similar efforts, are critical to maximizing the effective use of existing streets and highways.

- **P-2B: Integration with Smart Highway Plan.** As noted under Element H-3 above for Smart Highways, future plans for highways in the corridor require serious consideration of incorporating transit modes within the highway system. Consideration of modern Bus Rapid Transit (BRT), Light-Rail Transit (LRT) and commuter rail as alternatives to highway expansion needs to be undertaken during the early planning stages of future projects.

- **Element P-3: Expand Transit Awareness and Services.** Public and private sector efforts are needed to expand the public’s awareness of transit options throughout the corridor and provide services that better match the needs of potential customers. Often, potential transit users don’t know what services are available, where to get them, how much they cost, or if they can get to a particular destination using transit. Element S-3 under Smart/Safe Traveler addresses this point from a broader perspective – transportation customers need to know the full range of services available to them, including transit options (e.g., the TransitAdvisor component of TRIPS 123 in the Greater New York City Area, the Travel Information Gateway website). Using all available media – computers, phone, informational kiosks, etc. – potential public transportation riders can be reached and operators can increase the utilization of their services by meeting the needs of a broader variety of travel customers.

**SMART/SAFE TRAVELER.** On highway corridors across the country, transponder-based technologies are being used to collect tolls, electronically check commercial vehicle credentials, and facilitate the flow of vehicles at border crossings. E-ZPass and related programs operate throughout much of the northeastern US, and similar toll collection systems are in place in other regions, such as the Florida Department of Transportation’s SunPass pre-paid toll system and California’s FasTrack system. This capability has also spawned various pre-clearance programs, including the FAST and NEXUS programs operating at the Lacolle/Champlain crossings and at other US-Canada border crossings. Moreover, the same transponders used to collect tolls and expedite truck inspections also allow the corridor’s transportation agencies to gather information regarding traffic speeds and queuing, origin-destination patterns and other information useful in both day-to-day system operations and long term planning.

Internet-based technologies are also being used to provide traveler information along major Interstates. Internet-based information on best routes to take, available transit services, highway construction activities, weather and other possible sources of delay have gradually become available to assist travelers with trip planning. However, the ability to alter or adjust trip planning because of unforeseen travel events is difficult unless the travelers have access to the Internet – something that is normally not possible after leaving the home or office. Over the past
decade, transportation agencies in Georgia, Montana, Arizona, and several other states have made an effort to bring this information to travelers through travel kiosk systems that allow them to access this same information during the trip. In the mid 1990s, the Adirondack North Country Association activated seven kiosks in New York State, although newer technology now exists to improve these existing kiosks and to be used in new ones.

Both NYSDOT and NYSTA have implemented a wide variety of VMS and HAR-based systems to provide travelers in the corridor with real-time information about travel conditions, alternative routes around delay-causing incidents, and reinforcing safety messages (“Buckle Up!”). As systems to instantaneously gather highway operations information are expanded, the effectiveness of these VMS and HAR systems will likewise increase. Looking to the future, a wide variety of systems are being offered to travelers to allow them to obtain travel information while in their vehicles, ranging from GPS-based travel directions to warnings via cell phones about problems along the traveler’s normal commuter route. This type of real-time connection between the traveler and the system operators is generally viewed as the next major technology change, with travelers no longer needing to depend solely on VMS or HAR messages or calling information hot lines to obtain information. This issue is discussed further in Section 3.3.

The provision of a consistent network of modern rest areas is a key element in the State’s programs to enhance travelers’ convenience and improve highway safety. As outlined in its Statewide Rest Area Plan and regional I-87 Rest Area Corridor Plan, NYSDOT’s policy is to provide travelers services and information at sufficient intervals to meet the needs of long-range travelers, including long-haul trucking. Given the frequent use of rest areas for truck safety inspections, NYSDOT seeks to include sufficient space in each rest area (except Gateway Information Centers) to accommodate safety inspections. These and other truck safety and parking issues are discussed further under the Smart Freight plans and initiatives.

The key strategic elements necessary to create a Smart/Safe Traveler environment along the I-87 corridor are:

- **Element S-1: Comprehensive Pre-Trip and In-Trip Traveler Communication.** Transportation customers need easily accessible and up-to-the-minute information prior to their trips to aid in their choice of the best route, time of travel, and even travel mode. Shippers need similar up-front information to plan shipment routes and estimate travel times to optimize the use of their drivers and equipment. The vision in this area is clear – a “Smart” corridor must provide this type of trip planning information, not only to help customers in making their travel decisions but also to influence those decisions (e.g., more people using transit, traveling off-peak, avoiding construction zones, etc.).

The expanded availability of personal computers, web access, cable TV and in-vehicle applications has opened up communication channels that are easy to use by customers, and that are underutilized to date in this vital area. The figure at right, which indicates the real-time status of all sections of the NYS Thruway system, is an
example of this type of web-based travel information system. Further, in-trip information systems that permit real-time connections between operating agencies and their customers are essential to advanced incident management, especially along highways. Cell phones, personal digital assistants (PDAs, e.g., Palm Pilot), dedicated in-vehicle communication systems (e.g., Navistar) are providing the initial steps needed to enhance this type of in-trip communication beyond roadside signs, variable or dynamic display messages, and Highway Advisory Radio (HAR) messages. The on-going development by NYSDOT of a Statewide Information Exchange Network (IEN) will greatly enhance the ability of agencies to transfer information among each other, thereby making it available to the customers in a more timely fashion. The Travel Information Gateway website (www.travelinfony.com), recently created by the Transportation Federation (NYSDOT, NYSTA, NYSBA), provides a useful link between agencies and their customers. It offers extensive pre-trip travel information, with links to all travel modes in regions across the State, helping travelers to find the best modes and routes for their trips, travel-related weather conditions, construction sites to avoid, and much more.

- **Element S-2: Expanded Collection and Sharing of Data among Agencies.** Improved management of the transportation system and providing comprehensive and accurate real-time information to transportation customers will require more and better data, more automated and low-cost ways to collect and transmit the data, and more open sharing of data and information among agencies. NYSDOT’s ongoing Transformation efforts focus on this issue - the need to fundamentally change the way agencies gather, share and use a wide range of data and information. To achieve the long term vision of a fully informed driver, a major shift and expansion in data gathering systems by all involved transportation agencies are required. Towards this purpose, NYSDOT’s development of its IEN will establish common data reporting and transfer platforms and protocols to expedite the sharing of data among agencies and to make the data more useful and available to those agencies. The IEN provides a critical system component that ITS programs need to expand along the corridor and across the State.
Element S-3: Expanded Marketing and Education to Increase Usage. To effectively inform the traveling public about travel conditions, routing options and available alternative travel modes requires transportation customers to know that this information is available, how to get it, and in what ways it would be useful to them. This requires the agencies involved to not only make the communication systems more accessible and user-friendly, but to aggressively market these systems to the traveling public. The lengthy marketing effort needed to gain broad acceptance of such programs as E-ZPass, despite the program's seemingly obvious public benefits, demonstrates what is necessary. The effort needed to gain broad use of traveler information systems (like the pending Advanced Traveler Information System in the Capital District and the Trips 1-2-3 program in the southern end of the I-87 corridor) will be even greater, as the benefits will be initially less obvious to travelers. This type of marketing emphasis, both in this area and others, is consistent with the "guiding principles" behind the NYSDOT Transformation, and specifically with the desire to become more customer-focused. The Transformation goal of integrating the programs of multiple agencies is similarly relevant here, with agencies working, for example, toward a single transponder for each vehicle that could be used for toll collection, vehicle inspection, Customs checks and Smart Corridor programs.

Element S-4: Develop Public Perception of Smart Network. As noted under the Smart Highway Element H-2, agencies must not only manage and operate highways and arterials as unified networks, but the public must perceive that the transportation network's key elements are fully coordinated rather than controlled by a mix of non-coordinated agencies and authorities. In most urban areas, transit operations have been organized under regional authorities (e.g., CDTA in the Capital District, MTA in the Metropolitan New York City area), which have a publicly understood role, or have coordinated all public and private transit operations. Similar efforts are needed in the highway area. Programs like Trips 1-2-3 and similar efforts planned elsewhere in the corridor can be a major step in that direction.

SMART FREIGHT. A key aspect of the I-87 corridor is its function as an international trade route, a role which has increased substantially since the implementation of the North American Free Trade Agreement (NAFTA) in 1994. Trucking remains the mode of choice for transporting goods through the corridor, with an increased dependence on containerized freight. The trucking industry has responded to the increasing demand for truck freight through the use of tandem trucks, some of which require dedicated facilities such as tandem set-up/break-down areas and tandem-specific parking spaces at rest areas.

The demand for containerized rail freight in the corridor is also growing. As both rail freight and passenger volumes increase within the corridor (with both modes competing for the same track space), congestion along the rail system is becoming an increasingly significant issue, and railroads, like highways, are turning to advanced technologies, such as GPS-based train tracking, sensors and signal controls, to help better manage the system's capacity while...
maintaining safety. Combined with more traditional projects already being planned for parts of the corridor (e.g., continuous welded rail, sidings, and better track maintenance), these types of advanced control systems are being used throughout the US to bring relatively dated and constrained rail corridors up to modern-day standards. Railroads are also promoting the use of double stack cargo containers as a means of improving rail efficiency, promoting fuel efficiency, and maintaining market competitiveness.

At the same time, the trucking and rail industries, which historically have competed for business, are joining forces to boost their collective productivity. Trucking companies are now among the railroads’ largest customers, contracting with railroads for the long-haul transport of trailers and containers. Shippers use double stack containers on freight trains to carry cargo over long distances on high volume rail corridors, and use trucks more efficiently to move loads shorter distances between rail terminals and the cargo’s ultimate origin or destination. USDOT’s National Transportation Statistics shows that intermodal rail-truck freight is among the fastest growing of all freight modes. Due to this rapidly growing nationwide trend of intermodal rail-truck freight, as well as the new hours-of-service rules imposed on the trucking industry, the demand for efficient intermodal facilities is more pronounced than ever.

Despite reliance on trucking and rail as the main methods for moving goods through the corridor, freight is also transported via container barge along the Hudson River, between the Port of Albany and the Port of New York/New Jersey. Projections by FHWA’s Office of Freight Management and Operations indicate that while waterborne freight as a percentage of total freight handled (by weight and value) will decline over the next 20 years, waterborne freight in New York State will grow in terms of tonnage handled and total shipment value. Twice-a-week scheduled Express Barge service between the Port of New York/New Jersey and the Port of Albany is projected to result in an additional 18,500 containers annually at the Port of Albany by the end of 2005, which would account for an additional 250,000 tons of cargo, or a 30 percent increase in its present tonnage. Another important aspect of waterborne freight in the corridor is its link to the Port of Montreal. Due to its growth in recent years, the Port of Montreal has become an increasingly important source of freight traveling through the corridor, both by rail and (primarily) by truck, with every indication that these movements through the corridor (particularly containerized international freight) will continue to increase.

Although not directly related to waterborne cargo, it is also worth noting that New York State is responding to an increasing demand for recreational boating opportunities by converting its canal resources, which are no longer suitable for moving containerized cargo, for recreational use.

Cargo is also shipped to and from the corridor’s three commercial airports. Shippers such as UPS and FedEx provide air cargo service to and from Albany International Airport, Stewart International Airport, and Clinton County Airport (Plattsburgh International Airport in the future). The air cargo industry predominantly transports goods of low weight, high value, or high time sensitivity; bulk goods, raw materials, and durable goods are seldom transported by air. Other specialty goods commonly transported by air include high-tech products such as computer equipment, electronic, mechanical parts, and medical goods, some of which are manufactured in the Capital District.

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3 “Port Authority Project to Shift Some Cargo Traffic to Albany.” The Port in the News (December 2003).
Regardless of the mode cargo is carried by, perhaps the most significant trend affecting freight movement in the corridor is the emphasis on the security of both national and international freight shipments since the events of September 11, 2001. Border crossings in New York and other border states, including the I-87 corridor's Lacolle/Champlain highway crossing and the rail crossing at Rouses Point, have sharply increased security checks of both travelers and commercial drivers. The US Department of Homeland Security was created in 2002 to unify the network of agencies and programs dedicated to national security, including US Customs and Immigration and other inspection forces involved in border crossing security and safety. Also established under the Department of Homeland Security was the Transportation Security Administration, which has statutory responsibility for the security of the nation’s transportation systems, including but not limited to regulation, enforcement, inspection and screening, and education of carriers, passengers, and shippers. A variety of funding programs like Operation Safe Commerce (OSC) and the Container Security Initiative (CSI) were also established to assist state and local governments, private shippers, port authorities and others in meeting these increased demands through innovative and cost-effective methods.

At the same time, the United States and Canada recognize the importance of expediting the movement of goods across our borders, despite this increased emphasis on border security. The implementation of NAFTA in 1994 has increased the flow of goods between the US and Canada, including at the I-87 Lacolle/Champlain crossing. In order to preserve this, various pre-clearance programs for low-risk operators were created or expanded that allow enforcement agents to concentrate on high-risk shipments. Another program, the Customs-Trade Partnership Against Terrorism (C-TPAT), focuses on supply chain security, benefiting both public enforcement agencies and private operators by ensuring the integrity of freight shipments at each step of the chain, from the manufacturer to the ultimate destination. The FAST program is another critical component of this pre-clearance effort that uses public-private actions and coordination to expedite the flow of goods across borders.

The overall intent of the corridor’s Smart Freight initiatives is to use advanced technologies and systems, expanded agency coordination and public-private partnerships to improve freight operations’ efficiency and safety and maintain the corridor’s position as a major trade gateway.

The key strategic elements necessary to move toward the vision of a Smart Freight System are the following:

- **Element F-1: Expand Public-Private Partnerships.** Public agencies and private shippers in recent years have both been developing and gradually implementing complex technical systems to track the movement of freight around the world. Virtually all of the on-going and planned public sector projects – CVISN (Commercial Vehicle Information Systems and Networks), FAST (Free and Secure Trade), NORPASS (North American Preclearance and Safety System), OSCAR (One-Stop Credentialing and Registration System), etc. - all depend on the participation of private shippers and transportation carriers for their success. Many of these programs are successful on paper, but lack the necessary participation of the private shipping industry, which often cannot see how the program’s benefits would offset the required costs. At the same time, State and Federal agencies must be open to systems that can take advantage of the considerable capabilities of many of the “supply chain” freight
tracking systems being developed by private shippers. Expanding these partnerships is essential.

- **Element F-2: Continued State, Federal and International Coordination.** As with the move toward greater public-private partnerships and cooperation, a continued expansion of government agency coordination at the State, Federal and International levels is critical. This often requires some flexibility by all parties involved, as the agencies involved often have very different perspectives. Transportation and economic development agencies, for example, look to minimize delays in the flow of persons and goods across the US-Canada border, while the Department of Homeland Security views such delays as secondary to meeting increased border security needs. Developing programs, facilities and technologies to effectively meet the needs of all parties requires continuous interaction and communication among agencies, and a willingness by each party to reflect the other agencies’ needs and perspectives when setting their own policies. NYSDOT has taken critical initial steps to establish such partnerships, as demonstrated by the strong relationship it has formed with MTQ on initiatives such as the High-Speed Rail Study, and with US Customs and Border Protection and the Canada Border Services Agency on the “Port of Excellence” project.

- **Element F-3: Incorporate Safety & Security in Freight Planning.** All aspects of the freight network planning – from public roads to private warehouses, from border crossings to river crossings, from driver licensing procedures to highway rest area design – must incorporate new safety and security needs. Much of this requires a major shift in thinking by all parties involved, and can also involve extensive new costs and other impacts (e.g., the need for truck inspection areas near major river crossings, tightened perimeter controls and internal security at ports and warehouses, etc.). The evolution of the Port of Excellence plan at the US-Canada border crossing is a clear example of how to incorporate these increased safety and security needs.

- **Element F-4: Enhance CVO Capabilities.** It is clear that the lack of sufficient and properly designed and located CVO facilities in the corridor limits the involved agencies’ ability to provide the necessary level of freight monitoring. The Port of Excellence and planned permanent truck inspection station directly south of it are positive examples of what is needed, but they only deal with a small portion of freight movement in the corridor and across the State. Expanded use of weigh-in-motion (WIM) systems will effectively expand CVO enforcement, allowing the weight of a greater percentage of the trucks on the State’s roadways to be checked, thereby increasing compliance. NYSDOT and others are looking to increase the use of NORPASS by truck operators, which will make the State’s rollout of its “e-screening” CVISN program more feasible and effective. NYSDOT, NYSTA and others also plan to expand and better manage truck parking in public rest areas along I-87 and other corridors, and to better coordinate with similar private truck facilities. Greater efforts in these types of areas are important elements of Safe Freight operations in the corridor and Statewide.

- **Element F-5: Expanded Use of Non-Truck Freight.** Rail freight operations in the corridor, especially within the Primary Study Area between Albany and the Canadian border, are relatively limited. The restrictions in that area caused by the single-track Canadian Mainline, old track beds, inefficient signal systems, and other factors were summarized in Section 2 of this report. Corridor freight planning must look for ways to
further increase the use of rail freight, particularly for the movement of domestic and international container traffic, for it to become a truly smart freight corridor. This includes non-intrusive inspections of rail cars at the border, with expanded pre-clearance of container contents to expedite the process, as well as key rail infrastructure improvements (e.g., removal of clearance restrictions, improved signal systems, bypass tracks) to increase speeds and reliability. Further, efforts like the Express Barge Program (barging containerized freight from the Port of New York and New Jersey to the Port of Albany) developed as part of the Port Inland Distribution Network, and expanded air freight capabilities at Albany International Airport and other commercial airports in the corridor will help reduce truck traffic on I-87 and other highways by bringing waterborne and air freight closer to their eventual destinations.

3.1.4. Transportation Markets and Customers

NYSDOT’s “Transformation” process, as discussed in Section 1.4, is focusing future plans on meeting the expectations – e.g., mobility and reliability, safety, security, etc. - of transportation customers. Part of this shift to a more customer-oriented, corridor-based approach to transportation operations and planning is understanding what transportation markets effectively define each corridor; i.e.:

- **Commuter Travel Market** - shorter journey-to-work trips, usually by car, made on a daily basis, and compressed along routes leading to and from major employment centers.

- **Intercity Travel Market** - longer distance trips within the corridor made for a variety of personal and business trip functions. With longer distance comes a broader range of modal options (air, rail, auto, bus).

- **Trade (Freight) Market** - includes both long-distance freight movements, involving intra-state, interstate and international markets, as well as shorter-distance collector-distributor freight movements to shipments’ origin and destination points.

- **Tourist Travel Market** - includes short- to long-distance trips (including international) to recreational, natural and historic sites. (As a measure of the importance of this market to the corridor, origin-destination studies at the US/Canadian border confirmed that the majority of the auto travelers on I-87 heading into Canada are making some form of recreational trips.)

The following section presents a Corridor Strategic Plan that provides further details on the “Smart Corridor” elements discussed in the previous section to effectively meet the corridor’s identified needs and the expectations of the customers in each of its defining travel markets.
3.2. Strategic Plan Elements

The previous section established the overall vision to improve the efficiency and effectiveness of the I-87 Corridor's transportation network. This section lays out a Strategic Plan to move the corridor in that direction, combining actions already in motion or in various planning and implementation stages with new initiatives that either expand existing programs or implement and test emerging technologies. The Strategic Plan is organized along the four “Smart” categories discussed in Section 3.1, with each including the following elements:

- **On-Going Projects** - support for specific on-going or planned projects that have been developed by NYSDOT or other agencies to address defined transportation and economic development needs; and

- **Proposed Projects and Concepts** - actions needed to get existing projects moving and new ones required to keep the corridor in step with identified trends and to meet the overall and Smart Corridor goals and objectives.

While most of the projects, programs and technologies are focused primarily on one particular element of the transportation system, many would provide benefits across a number of areas. This is especially true when it comes to ITS initiatives, which by definition are meant to improve data collection and dissemination, system operations, traveler information networks and other areas that cut across modes and agencies and are often consistent with fundamental elements in all four Smart categories.

Section 3.2.1 through 3.2.4 discuss the various on-going projects and proposed projects and concepts in each area and how each would help better meet the needs and expectations of the customers in the corridor's four transportation markets. Some of the projects or programs mentioned in these sections are critical to successfully moving forward in these Smart Corridor areas, while others may have local importance or be a good example of a concept's application but do not represent essential, foundation-type actions. Finally, Section 3.2.5 summarizes the way in which the Strategic Plan's overall combination of on-going and proposed projects matches up with the various Smart Corridor elements described in Section 3.1.

Section 4 of this report provides further details on the steps needed to get the programs and projects within the plan implemented, including those requiring priority action versus those that are less critical. Mechanisms are also presented to track and coordinate all of these corridor actions to insure their effectiveness both individually and as a comprehensive plan.

3.2.1. Strategic Plan – Smart Highways

Several projects and studies that advance the various Smart Highways elements discussed in Section 3.1 are currently being carried out in the I-87 corridor or have been identified as additional projects or concepts for consideration during this Study. These projects are listed in Table 3-1 and are described in further detail below:
Table 3-1
On-Going Projects and Proposed Projects and Concepts:
SMART HIGHWAYS

<table>
<thead>
<tr>
<th>On-Going Projects</th>
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<tbody>
<tr>
<td>• NYSDOT and NYSTA Capital Program</td>
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<td>• I-87 Interchange and Access Improvements</td>
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<tr>
<td>o Including the Albany Corridor Study, the Exit 3 Interchange Project, and</td>
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<tr>
<td>improvements at Northway Exits 6, 9, 10, 11, 12, and 18</td>
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<tr>
<td>• Tappan Zee Bridge/I-287 Corridor Study</td>
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<tr>
<td>o Also meets Smart Public Transportation elements</td>
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<tr>
<td>• NYSDOT and NYSTA ITS Programs in the Capital District and Metropolitan NY</td>
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<tr>
<td>o Also meets Smart Public Transportation, Smart/Safe Traveler, and Smart</td>
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<td>Freight elements</td>
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<tr>
<td>• Integrated Incident Management System (IIMS) Along I-87 Corridor</td>
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<tr>
<th>Proposed Projects and Concepts</th>
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<tr>
<td>• I-87/Route 9 Closed Loop Traffic Control System</td>
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<tr>
<td>o Also meets Smart/Safe Traveler elements</td>
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<tr>
<td>• Exit 20 Improved Access and Queue Detection</td>
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<tr>
<td>o Also meets Smart/Safe Traveler elements</td>
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<tr>
<td>• Other Long-List Highway Projects, including:</td>
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<tr>
<td>o Improved highway access to proposed development sites (Luther Forest in</td>
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<td>Saratoga, SUNY technology hub in Albany)</td>
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<tr>
<td>o Improvements to Routes 4 and 149 for east-west corridor access to I-87</td>
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</table>

Smart Highways: On-Going Projects

- **NYSDOT and NYSTA Capital Program.** NYSDOT’s and NYSTA’s short-term capital programs for the I-87 corridor focus primarily on pavement and bridge maintenance-type efforts to extend the useful life of the existing facilities. In general the bridges are circa 1950’s and 1960’s vintage, which contributes to age-related deterioration as well as designs that do not meet present standards (e.g., clearance heights). Due to the high cost of addressing these types of bridge deficiencies, their replacement is usually deferred until it can become part of a larger project. There are highway segments within the corridor, typically along I-87 between the Capital District and Saratoga County (from Exit 1 to the “Twin Bridges”), which are programmed by NYSDOT for major reconstruction in the near to mid-term future, and will require detailed study of the best methods to meet future travel needs (expanded travel demand vs. the transportation systems management programs, traditional highway capacity expansion vs. High-Occupancy/Toll (HOT) lane-type programs, etc.). Similar programs for secondary highways (e.g., improvements along the vital Route 73 corridor connecting Lake Placid to I-87) have been defined but require funding.
**I-87 Interchange and Access Improvements.** Several separate studies are being conducted to improve interchange and access connections along the New York State Thruway, between the Thruway and the Adirondack Northway, and at designated interchanges along I-87 from the Capital District into the southern Adirondacks:

- NYSTA has initiated the **Albany Corridor Study** to develop a prioritized 20-year capital improvement plan to address structural, safety, capacity, and operational needs for the portion of the Thruway between Interchange 21A (Berkshire Connector) and Interchange 25A (I-88 in Schenectady). The study will identify improvements to alleviate congestion along the Thruway mainline, at toll plazas, and at Interchanges 23, 24, 25, and 25A, as well as evaluate the structural condition of Thruway pavements and bridges. The outcome of the study will significantly impact the operations of Interchange 24, where the Thruway intersects with the Northway. The project is considering a wide variety of alternatives - including high-speed E-ZPass interchanges, mainline toll barriers that incorporate both overhead high-speed E-ZPass readers and traditional toll booths for cash customers, and major reconstruction of existing interchanges - to expedite the flow of traffic and meet growing and changing travel patterns in the Capital District.

- NYSDOT has developed an **Exit 3 Interchange Project**, which will examine the potential for a new Northway interchange in the Town of Colonie to improve access between I-87, Albany International Airport, and the Wolf Road area, while also improving safety and operating conditions at the existing Exit 4. These improvements are necessary to better handle traffic in this critical segment of highway and to enhance access to an expanding and economically vital airport. The project is ready to be implemented as soon as funding is identified.

- Operational constraints at **Northway Exit 6** in Latham, at the junction of US Route 7 and US Route 2, are currently being studied by NYSDOT. There are no plans for maintenance or modifications at this time.

- The bridges at **Northway Exit 9** have been the subject of on-going maintenance efforts by NYSDOT. No large scale improvements or modifications to the interchange are programmed at this time.

- NYSDOT has recently completed a reconstruction and bridge replacement at **Northway Exit 10** in Clifton Park. The Town of Clifton Park is currently advancing a State- and Federally-funded project that will add a sidewalk to the existing bridge carrying Ushers Road over I-87 in Spring 2005. Sidewalks will be extended along Ushers Road between I-87 and US Route 9.

- Access improvements at **Northway Exit 11**, initiated in response to increasing use of the local roadway system to connect between I-87 and US Route 9 through the Village of Round Lake, are currently in the preliminary design development phase. This project, known as the Round Lake Bypass, has been associated with the access needs identified within the on-going Luther Forest Technology Campus SEQRA review and approval process. A specific schedule for the project has not been determined, as available funds for the project and its overall priority must be assessed against competing projects and program needs.

- Final design plans for access improvements to **Northway Exit 12** in the Town of Malta were completed in Fall 2004. The proposed improvements, scheduled for construction in
Spring 2005, include the replacement of the traditional traffic signal-controlled, diamond-type interchange with a system of multiple roundabouts. The roundabouts will control traffic movements at the junctions of the I-87 ramps with NYS Route 67, the US Route 9-Route 67 intersection, and the junction of Route 67 with access points to two commercial developments.

- **Northway Exit 18** in the Town of Queensbury will undergo minor improvements to the northbound exit ramp as part of a larger locally-sponsored, State and Federal Aid project to reconstruct Corinth Road between the interchange and the City of Glens Falls. The ramp modifications are a short-term improvement in response to traffic operational deficiencies that were identified during the project development process. Larger-scale interchange improvements such as the reconstruction of the interchange or replacement of the bridges carrying I-87 over Corinth Road are not currently included in the Region 1 capital program.

- **Tappan Zee Bridge/I-287 Corridor Study.** A complex alternatives analysis is being conducted for a major future capital investment to improve corridor accessibility and mobility. Because this project is evaluating a variety of transit, paratransit and non-traditional methods of responding to the corridor demands (e.g., HOT lanes), it also meets several of the Smart Public Transportation elements discussed in the previous section.

  The project is assessing the improvements needed in this highly congested and vital corridor within Rockland and Westchester Counties at the southern end of the I-87 Corridor Study Area. Some important preliminary findings from the Alternatives Analysis phase of this study are that:
  
  - long term corridor travel demand cannot be met by simply expanding highways and bridges; and
  - transit modes, to effectively increase mobility, must have dedicated guideways or lanes that provide them with a travel time advantage relative to general highway traffic.

  Extensive consideration of HOT lanes, in lieu of additional general purpose lanes, to create fully managed highway capacity, is another measure of the evolution of planning for major highway projects. Collectively, the study is considering changes in highway operations and the introduction of major new transit systems that could substantially change the way mobility needs are met in the future in this section of the corridor.

- **NYSDOT and NYSTA ITS Programs in the Capital District and Metropolitan NY.** Both NYSDOT and NYSTA have on-going capital programs and initiatives which are advancing ITS capabilities within the corridor. The following are the most noteworthy examples of these initiatives:
  
  - NYSDOT is advancing an Information Exchange Network (IEN) to establish common data reporting and transfer platforms and protocols to expedite the sharing of data among agencies and to make the data more useful and available to those agencies. The IEN will serve as a communications platform for all electronic data distribution in the state and is an essential component of the vision for an integrated and comprehensive ITS program in the corridor and throughout New York State. The IEN’s benefits to transportation agencies ties in with the Transportation Federation’s introduction of the Travel Information Gateway website, eventually enabling the traveler information
systems provided at that site to increase in their breadth and effectiveness as the IEN and related ITS programs are implemented and expanded.

- Both NYSTA and NYSDOT are expanding the deployment of TRANSMIT infrastructure along segments of the Thruway and I-87, as well as I-787, Alternate Route 7, and I-90 in the Capital District, to better evaluate traffic conditions and congestion, and to tie that information into VMS to inform travelers about traffic conditions.

- NYSDOT is placing some additional closed-circuit television cameras at strategic locations along I-87 north of the Capital District (e.g., Exit 13 and Exit 15) to better address congestion and incident management in those areas.

- NYSDOT is expanding and upgrading its overall VMS capabilities in the Capital District.

- As another part of its improved incident management, NYSDOT and the NYSTA are expanding the use of Highway Emergency Local Patrol (HELP) trucks to provide on-site roadside motorist assistance within the Capital District, thereby clearing up breakdown-related problems faster.

- NYSDOT, NYSTA and the NYS Police are furthering the development of the Capital District Transportation Management Center (TMC), which is being expanded to handle a wider array of functions and programs. These same agencies are working together to develop the new TMC in Westchester County.

- NYSDOT is advancing a “Call I-87” Smart Telephone project, which would allow travelers to obtain in-trip information such as real-time traffic alerts and weather advisories by dialing a single toll-free telephone number.

In addition to these traffic and incident management initiatives, various ITS components are included in or supported by the more traditional capital highway and bridge infrastructure maintenance, repair and safety programs of NYSDOT and NYSTA, such as fixed automated spray technology systems for automatically deicing bridges.

### Smart Highways: Proposed Projects and Concepts

- **I-87/Route 9 Closed-Loop Traffic Control System.** This closed-loop traffic management system would improve traffic conditions and safety along I-87 in Albany and Saratoga counties, along the Northway between Exits 5 and 10, on parallel segments of Route 9, and on Alternate Route 7. The system, which would build upon the existing ITS Incident Management and Traveler Information System in the Capital District, would substantially improve the State's incident management capabilities by allowing NYSDOT and other agencies managing the area's highways through the TMC to collect real-time information about travel conditions along Route 9 and I-87 with automatic signal controls, use that data to implement traffic diversion schemes, and provide this information to travelers via VMS and HAR equipment along all routes. This would create a closed-loop...
system that could then be extended to other routes, with key segments of I-787 and I-90 as the most logical candidates for later phases of this program.

This project would help address the growing capacity problems in this section of the Capital District’s highway network, applying advanced ITS techniques to help meet traffic demand without expanding the roadways. It addresses this issue in the portion of the network where these problems are the greatest. It would also provide a pilot project to assess the viability of a more extensive application of the closed loop concept.

- **Exit 20 Improved Access and Queue Detection.** The Exit 20 Improved Access and Queue Detection initiative is a permanent queue detection system at the northbound exit ramp of Exit 20. This exit ramp currently experiences traffic queuing that extends onto the I-87 mainline during periods of peak tourist and commercial traffic, creating a potentially dangerous situation for motorists and impeding traffic flow to local sites, tourist destinations, special events, and commercial routes to and from Vermont. The purpose of the proposed system is to recognize traffic back-ups that extend onto the ramp and automatically advise motorists of those traffic conditions, as well as to provide motorists with information about expected delays, alternate routings, and stopped vehicles. The queue detection system would be dynamically linked through a communications system to a flashing beacon assembly upstream of Exit 20, and a series of variable message signs (VMSs) located upstream of Exits 17 and 19.

The primary objective of the system is to improve safety and facilitate alternate routings during periods of peak congestion; a secondary and related objective is to provide motorists with information related to special events or occurrences for use in travel planning.

- **Improved East/West Access Via Routes 4 and 149.** These corridors, which provide an east-west connection between Warren and Washington counties (and I-87 at Exit 20) and Central/Northern Vermont, handle an increasing level of tourist and truck traffic. Various highway improvements are currently being implemented on Route 149 between the Washington County line and Route 9L in Warren County, and the segment of Route 4 between Fort Ann and the Vermont border is currently being studied. Future improvements to this important east-west corridor could include geometric upgrades to facilitate more efficient movement of commercial vehicles; access improvements at the Northway; bypass routes around the most heavily impacted communities; and ITS initiatives to enhance commercial traffic flow along the corridor.

- **Integrated Incident Management System (IIMS) Along I-87 Corridor.** This real-time incident management system presently being deployed by New York City’s Departments of Transportation and Police and Office of Emergency Management uses mobile computers and video capabilities, GPS tracking and other communications technologies to quickly transmit incident information among involved agencies. Whereas traditional methods of incident response coordination rely on voice-only communication, which often results in the transmission of imprecise location data, limited incident description, and unreliable assessment of impacts, IIMS allows incident responders with mobile computers to collect incident information and transmit it to inter-connected agencies. The information collected – including data reports, accurate location based on GPS, and digital photographs taken at the incident scene – enables responsible agencies to select appropriate responders and equipment for clearance. During a major incident, IIMS can
coordinate a multi-agency response, while field responders can report infrastructure damage, environmental hazards, and incident severity. IIMS can also support incident command by identifying staging areas and emergency response and evacuation routes. If the system proves successful in the New York City region, NYSDOT could then deploy IIMS along the I-87 corridor.

Other Projects Considered

- **Low-Cost Improvements to Capital District Highway Interchanges.** With major segments of I-87, I-787 and I-90 reaching their useful design life within the next 10-15 years, consideration should be given to expanding capacity when segments of these systems within the Capital District are reconstructed. A key area of identified concern is the Twin Bridges themselves, which are an effective capacity “choke point” that negatively affect peak hour highway operations in both directions on a regular basis. Until the decision to implement a full reconstruction of the pavement structure and the significant capital costs that would entail, the potential for short-term, low-cost improvements along portions of I-87 that experience recurring peak-period congestion need to be identified. The opportunities which were assessed by the Study Team for near-term implementation and relief included a number of geometric improvements to several key interchanges between Interchange 9 in Clifton Park and the I-90/I-87 Interchange 24 in Colonie, and consideration of ramp metering to reduce conflicts traffic entering I-87 at the major interchanges in southern Saratoga County.

The feasibility of ramp metering was evaluated for several locations along the Northway in the Capital District, including Interchanges 8 and 8A in Saratoga County. The high traffic volumes during peak-periods, the low speeds on I-87 resulting from those high traffic volumes, and the short distance between Interchanges 8 and 8A made this segment of the corridor a good test-case candidate. The traffic modeling of ramp metering concepts at these locations indicated that ramp metering could not meaningfully improve flow conditions on I-87 under current conditions unless some deterioration in the local roadway system (due to spillback from the ramp meter) was allowed to occur. A comparison between vehicle hours of delay for existing conditions versus ramp metering conditions showed regardless of the type of mainline improvements utilized, the overall delay experienced on the mainline and local system increased when ramp metering was implemented. The model demonstrated that ramp metering cannot provide measurable benefits under the current volume conditions. Without alternate routes parallel to I-87 for vehicles to divert to, choices are limited for commuters.

Although ramp metering does not appear to provide operational benefits at this location under current conditions, it may become feasible in the future. In conjunction with transit improvements and better connections to alternative roadways, ramp metering, if applied on a systematic basis, may provide relief to the recurring peak congestion experienced on I-87. Numerous studies and applications across the State and nationwide have shown that when applied appropriately, ramp metering, especially with priority by-pass for buses and other high-occupancy vehicles, can be a useful and cost-effective ITS tool. As such, it is an important part of the Transportation Systems Management (TSM) packages being considered for highway projects such as the Tappan Zee Bridge/I-287 Corridor Study noted earlier.
Smart Highways Serving Transportation Markets and Customers

In addition to advancing the various Smart Corridor elements established as part of the I-87 Multimodal Corridor Study, each of the on-going and proposed implementation projects and concepts described above also improves the ability of NYSDOT and other agencies to meet the needs and expectations of its various customer groups. Due to their central transport role, efficient highways provide benefits across all of the corridor’s key transportation markets. Because of its focus on peak-hour highway congestion, when the need for increased effective capacity is the greatest, commuters in the corridor’s two major commuter market areas – the Capital District and the I-287 segment in Rockland and Westchester – are the primary beneficiaries. However, tourists traveling to Catskill and North Country recreation attractions and commercial freight operators moving goods along the corridor all benefit from improvements to corridor segments that currently experience congestion. In addition, a strengthened and unified program of ITS and CVO applications in the corridor will allow NYSDOT, NYSTA, and the NYS Bridge Authority to consolidate the collection and sharing of information and coordinate transportation planning and policy-making to more effectively move people and goods across the state. If done properly, this allows the traveling public to experience the seamless and coordinated transportation network that it expects.

3.2.2. Strategic Plan – Smart Public Transportation

Several projects and studies that advance the various Smart Public Transportation elements discussed in Section 3.1 are currently being carried out in the I-87 corridor or have been identified as additional projects or concepts for consideration during this Study. These projects are listed in Table 3-2 and described in further detail below:

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<thead>
<tr>
<th>Table 3-2 On-Going Projects and Proposed Projects and Concepts: SMART PUBLIC TRANSPORTATION</th>
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<tr>
<td><strong>On-Going Projects</strong></td>
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<tr>
<td>• Route 5 Signal Override Study</td>
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<tr>
<td>• Stewart International Airport Transit Access Study</td>
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<tr>
<td>• Plattsburgh International Airport</td>
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<tr>
<td>• Commercial and General Aviation Improvements</td>
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<tr>
<td><strong>Proposed Projects and Concepts</strong></td>
</tr>
<tr>
<td>• Adirondack Rail Corridor Service Improvements</td>
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<td>o Also meets Smart Freight elements</td>
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A variety of other important projects or initiatives, all consistent with the public transportation trends noted above and the drive toward Smart Public Transportation in the corridor, were identified by the Study Team in discussions with transportation and economic development agencies and private sector groups in the corridor during Phase I of the study. These initiatives require a level of analysis that exceeds the timeframe of the current I-87 Study and will be pursued in greater detail in future efforts. These concepts include:
Strategic Plan Elements

- providing expanded public transportation services in the North Country, both to provide non-automobile access to the area's many recreational and tourism attractions and to provide moderate-income workers with low-cost travel to key employment centers;

- incorporating transit and para-transit and travel demand management (TDM) planning into the design and operations of the planned Luther Forest development in Saratoga, to reduce its traffic impact and make its employment opportunities accessible to those without autos;

- better public transportation access to the Plattsburgh International Airport and other airports in the corridor, extending its effective market reach;

- better transit links to Amtrak stations, particularly those serving the major tourism attractions in the North Country;

- further assessments of general aviation facilities in Essex County to determine whether improvements to existing facilities or development of a new facility (closer to I-87) would best meet general aviation needs; and

- serious consideration of dedicated guideway transit operations in areas like the Albany Capital District, including possible inclusion of Bus Rapid Transit (BRT) networks in the long term plans for major highway and arterial corridors in the area.

Smart Public Transportation: On-Going Projects

- **Route 5 Signal Override Study.** This on-going study by CDTC is looking to enhance the competitive position of bus transit in one of the Capital Region's most congested arterials. A signal override system has already been implemented along the corridor, and other concepts to be tested include dedicated bus lanes and other service enhancements, such as improved bus stops and vehicles. The effort is viewed as a demonstration project, testing and promoting concepts that increase the people-carrying capacity of the corridor. The study faces numerous challenges, because any move to provide additional signal timing or roadway space for transit must compete with the needs of other traffic that presently carries the vast majority of the traveling public.

- **Stewart International Airport Transit Access Study.** Completed in conjunction with the Tappan Zee Bridge/I-287 Corridor Study being carried out by NYSTA and MTA Metro-North Railroad (see below), the Stewart Transit Access Study assessed extensions of existing commuter rail lines to provide direct access to the airport from high-density population and employment centers to the south. A variety of transit modes were considered, from traditional commuter rail to light-rail and BRT connections to existing regional transit lines, as well as waterborne links. The transit link would also provide similar access to potential development sites in and around the airport, and would better link the high-growth portions of Orange and Ulster Counties to the New York Metropolitan transportation network. Commuter rail service provided the most benefit in terms of significant reductions in travel time to and from the airport, and support for more air service out of Stewart, but also had significant capital costs and various other impacts that required further study. Near-term use of bus-links to existing rail lines and express bus service from New York City and elsewhere, were recommended in the interim while more detailed studies
were performed.4

- **Plattsburgh International Airport.** Critical to the various efforts to improve aviation services in the North Country is the development of the Plattsburgh International Airport of the site of the former Plattsburgh Air Force Base. Initially involving the transfer of general aviation and limited commercial operations from the Clinton County Airport, the overall plan includes plans for a new passenger terminal, attracting expanded air cargo operations, and using its proximity to the Montreal metropolitan area to attract low-cost scheduled airline service. This type of service is considered to be important to the long term economic health of the area, and in providing competitive air service accessibility to North Country tourist and business convention and meeting operations. As noted above, better public transit access to the airport is also considered vital to extend its market reach.

- **Commercial and General Aviation Improvements.** In addition to the development of Plattsburgh International Airport, numerous airport projects are currently being planned and implemented throughout the study corridor to meet various aviation needs — including the limited access to full service commercial aviation airports in the North Country, the need to upgrade services and address nonstandard conditions at many general aviation facilities, and improved highway access to existing airports throughout the corridor — that were identified previous to this Study. All of the projects listed below are consistent with the overall Study goals of enhancing the movement of people and goods in the corridor and supporting economic development in the region. These projects were also included in this Study's “long-list” of potential improvement projects.

Some of the improvements listed below would be funded under NYSDOT’s planned AIR 99 program, which is intended to address the need for strategic investments in general aviation airports that may not receive funding under FAA’s Airport Improvement Program. The purpose of the AIR 99 program is to create a network of airports with sufficiently upgraded facilities (with longer runways, improved weather stations and vertical guidance instrument approach (VGIA) systems, associated approach ground clearance, and parallel taxiways) to adequately serve business aircraft. The goal of this program is to improve corridor airports and others throughout the state, to promote economic development opportunities that will enhance economic sustainability.

Commercial and general aviation improvements currently underway or in the planning/design stages in the corridor include the following:

**Commercial Airport Improvements**

- Albany International Airport
  - Runway 19 extension (7,200 to 8,500 feet)
  - Terminal building expansion

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- I-87 Interchange 3 (access improvement)
  - Stewart International Airport
    - Terminal building improvements
    - I-84 interchange at Drury Lane (direct access to SIA)
  - Plattsburgh International Airport
    - Relocation of airline terminal and general aviation facilities from Clinton County
    - Development of new terminal facilities
    - Automated weather station

**General Aviation Airport Improvements**

- Lake Placid and Adirondack Regional
  - Development of additional hangars and apron parking
  - Airfield safety improvements, including automated weather station, VGIA system, and approach clearing
- Schroon Lake (Essex County)
  - Airfield safety improvements, including automated weather station, VGIA system, and approach clearing
  - Aircraft parking apron and parallel taxiways
- Saratoga County Airport
  - Additional hangars
  - VGIA system
- Floyd Bennett-Memorial Airport (Warren County)
  - Development of additional hangars and apron parking
  - Airport industrial park
  - Runway extension
  - VGIA system and approach clearing
- Ticonderoga Municipal Airport (Essex County)
  - Runway reconstruction
  - Parallel taxiway
  - Property acquisition
  - Automated weather station, VGIA system, and approach clearing
- Schenectady County Airport
  - Corporate aviation facility improvements
  - VGIA system
  - Taxiway rehabilitation
- South Albany Airport
  - Development of hangars and apron parking
Smart Public Transportation: Proposed Projects and Concepts

- **Adirondack Rail Corridor Service Improvements.** This initiative is actually a series of separate projects, which include both physical improvements to rail infrastructure and service enhancements. These projects would collectively provide benefits to both freight and passenger rail in the corridor. In addition to the projects included in this initiative, several on-going capital improvement programs of CSX and CP Rail discussed later in this report as elements of the Smart Freight component of this Study would also enhance passenger service on Amtrak’s Empire and Adirondack lines, as well as make possible the expansion of intercity passenger service in the Capital District.

  - **Adirondack Corridor High-Speed Rail Track and Operational Improvements.** The I-87 High-Speed Rail Pre-Feasibility Study conducted as part of the larger I-87 Multimodal Corridor Study identified a variety of rail network improvements along CP Rail’s Canadian Mainline to reduce rail travel time between Albany and Montreal and increase reliability. This series of “maintenance upgrade” (MU) projects, which would address the systems’ chokepoints and overall lack of reliability, include track upgrades such as the construction of new sidings, the replacement of sections of jointed rail with continuous welded rail, curve realignment, and track resurfacing. Combined with FRA approval of higher maximum allowable speeds based in these areas and the increased reliability these improvements would provide, time savings of approximately 45 minutes between Albany and Rouses Point are projected. Similar improvements within Quebec would provide similar benefits. NYSDOT and MTQ will also pursue the feasibility of relocating the Customs inspections of rail passengers away from the border to the terminal station in Montreal, thereby reducing travel time by over an hour.

  An enhanced signal system study should also be completed to ascertain possible cost-effective methods of establishing a more reliable, safer and higher-capacity train control system in the corridor. The MU projects discussed would only increase the reliability of the existing block signal system, but would still limit trains in the corridor to 79 mph and would not provide any of the substantial benefits of GPS-based signal systems. More advanced train control and grade crossing warning systems, calibrated for higher passenger and freight train speeds, need to be considered.

  - **Expanded Rail Service to Saratoga County.** This concept looks to build on the success of the Empire Corridor between Albany/Rensselaer and New York City by extending the service to Schenectady and Saratoga Springs to serve the fastest growing areas of the Capital District. This proposal would extend one additional train per day, taking advantage of the new Saratoga Springs Station, and tying this important rapid growth area more closely to both the Albany area and to New York City.

As part of this effort, transit improvements to enhance Albany-Rensselaer Station connectivity should also be considered. At the present time, personal autos and taxis handle virtually all trips to and from the Albany/Rensselaer station. Significant increases in bus service between the station and key Albany area destinations would be needed to expand the
usefulness of these bus routes to train passengers. However, certain minor service and schedule modifications to existing CDTA bus routes would enhance connectivity with Amtrak's Empire service, reduce waiting times for the service to downtown, and expand bus service to employment centers to the west of downtown Albany at no additional operating cost.

- **Commuter Rail Service in Capital District.** When considering improvements to the corridor's Empire and Adirondack rail services, the Study Team also reviewed the possibility of using or expanding the Capital District's available rail infrastructure to introduce commuter-type rail service, particularly between Saratoga and Albany. Consistent with previous studies of this issue by CDTC and CDTA, these assessments indicated that the likely number of passengers in the foreseeable future was not sufficient to warrant the considerable expense of providing the facilities and service frequencies needed to attract commuters. From a longer-term perspective, greater regional efforts (including land use controls and incentives) to support higher-density transit-oriented development along the corridor could make the introduction of some form of high-capacity transit service more feasible. The introduction of lower-cost transit options like BRT in the corridor could help support these types of land use changes and gradually develop sufficient development densities to make rail service more viable.

### Smart Public Transportation Serving Transportation Markets and Customers

In addition to advancing the various Smart Corridor elements established as part of the I-87 Multimodal Corridor Study, each of the on-going and proposed implementation projects and concepts described above also improves the ability of NYSDOT to meet the needs and expectations of its various customer groups. For instance, commuters in the Capital District would benefit if bus and rail improvements such as a Route 5 signal override system, enhancements to transit service to and from the Albany-Rensselaer Station, and the expansion of Empire Corridor service to Saratoga County were implemented. Longer, intercity passenger rail trips and freight movement through the corridor would also be enhanced by the various on-going and proposed infrastructure improvements along the corridor. Finally, the tourist travel market would also be served by these rail infrastructure and service improvements, as well as by improved access to Stewart International Airport. The principal message that has been supported by numerous transportation studies in recent years is that the long term mobility needs of the traveling public in major transportation corridors cannot be met by the automobile alone, and improved, better organized and financially supported public transportation systems and services are critical.

#### 3.2.3. Strategic Plan – Smart/ Safe Traveler

Several projects and studies that advance the various Smart/Safe Traveler elements discussed in Section 3.1 are currently being carried out in the I-87 corridor or have been identified as additional projects or concepts for consideration during this Study. These projects are listed in Table 3-3 and are described in further detail below:
A variety of other “long list“ initiatives, consistent with the Smart/Safe Traveler elements presented in Section 3.1, were identified by the Study Team during discussions with transportation agencies and other groups in the corridor during Phase I of the study. These include (1) the on-going programs by NYSDOT and NYSTA noted above to expand and upgrade the corridor’s rest area facilities and services; and (2) creation of dedicated US-Canada border facilities to support expanded inspection of recreational boaters on Lake Champlain. A comprehensive, corridor-wide study to determine the best location for rest area facilities, as well as the possibility of separate facilities for personal and commercial vehicles, will also be necessary in the future to advance NYSDOT’s policy of providing traveler services and information at sufficient intervals to meet the needs of long-range travelers, including long-haul trucking. Each of these important activities would further strengthen the State’s ability to meet traveler safety and security needs.

### Smart/ Safe Traveler: On-Going Projects

- **Marketing of NEXUS Program.** NYSDOT and MTQ are promoting the NEXUS program to enhance border security and facilitate the flow of low-risk travelers along the corridor. The program uses ITS and advanced communications technologies to expedite the checking process at the border.

- **New York State Transportation Federation Travel Information Gateway.** The New York State Transportation Federation, a partnership between NYSDOT, NYSTA, and the NYS Bridge Authority, recently launched a website (www.travelinfony.com) that provides travelers with one-stop access to a variety of transportation information resources, including real-time traffic information for the State's main highways, construction locations and work status, temporary road closures, accident locations, and hazardous driving conditions. In addition, commercial vehicle operators can obtain information on permit requirements for

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Table 3-3

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<th>On-Going Projects</th>
<th>Proposed Projects and Concepts</th>
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<td>• Marketing of NEXUS Program</td>
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<td>• New York State Transportation Federation Travel Information Gateway</td>
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travel on State highways and bridges. Telephone numbers and links to regional New York State Police troops also are available, along with links providing weather conditions and five-day regional forecasts. The website also links to previously established traveler information programs in the state, including the TRIPS123 traveler information system in the New York metropolitan area, the INFORM system on Long Island, and the NYS Transportation Federation Winter Travel Advisory System.

**Smart/ Safe Traveler: Proposed Projects and Concepts**

- **Improved Wireless Communication on the Northway.** There is currently a communications dead-zone along the Northway between roughly Exits 26 and 35. The lack of cell phone or other wireless service places severe limits on any public or private sector activities, including a number of the ITS-based projects discussed in this report (e.g., the inability of NYS Police and NYSDOT truck inspectors to use wireless communications to perform “e-credentialing” and related inspection activities). While telecommunication cables exist within the Northway right-of-way, they have never been activated, due to the inability of the program’s private sector partners to attract cell phone service providers to offset the system’s costs. The lack of action in this area has prevented the provision of new call-boxes along the highway, the establishment of seamless telecommunications coverage along the corridor, and the effective distribution of data to and from the corridor’s proposed ITS and CVO systems.

It is critically imperative that this communications “backbone” be activated, based on:

  o strong concerns expressed by residents and businesses in adjacent communities over their communications isolation;

  o the safety issue of having no call boxes or cell phone service in this isolated stretch of highway;

  o the difficulty in attracting new business to an area lacking this communications link -- branching from the fiber optic backbone at strategically placed hubs would facilitate technology expansion and opportunities in the underserved North County areas; and

  o the severe limitations this lack of wireless communication place on many of the projects proposed to create a Smart Corridor.

This action is not directly tied to any single Smart Corridor element described in Section 3.1. Rather, it is necessary to fill a gap in the corridor’s communications infrastructure -- one for which most of the work has already been done but which needs a concerted public-private effort to be realized. Without this action, which is discussed further in Section 4, many of the identified Smart Corridor elements will be difficult to achieve in this section of the corridor.

- **Expanded Queue Detection and Warning System at the US-Canada Border.** This project involves the expansion of the existing northbound queue detection system with a system using reliable, proven state-of-the-art technology, integrated with an advanced system of permanent VMS on the northbound I-87 approach to the US-Canada border. The primary purpose of the project is to reduce the potential for accidents due to traffic queues on the highway approaching the border. The proposed system would provide a robust automated display system providing drivers with “real-time” information in both English and French about queuing conditions durations in sufficient time to make alternate travel
decisions – e.g., whether to stop for lunch. (A similar queue detection system is being developed by Canadian authorities on the southbound Autoroute 15 approach to the border crossing.) All queue information would be directly communicated to NYSDOT and MTQ offices, provided to Customs personnel at the border, and tied into the statewide IEN so travelers elsewhere in the state with access to that network could check on queuing conditions and delays.

Installation of the expanded queue detection system would improve safety and support Customs operations by continuously monitoring processing time through the border and helping direct the assignment of Customs personnel. As such, the system would become an important part of the overall change-over of the Champlain-Lacolle crossing to a “Port of Excellence.”

- **3-Tiered Tourist Kiosk System.** This project involves the deployment of a web-based system of information kiosks along the corridor to assist travelers in advance with trip planning and provide real-time information regarding specific attractions to help them make decisions during their trips to and stays in the Adirondack region. These kiosks would help drivers in their search for specific destinations, broader destination information (e.g., places to eat, stay overnight, get gas, etc.), and real-time information about conditions at those locations (e.g., are specific hiking trails already overcrowded). In addition to the destination type of information, travelers would have access to weather and road condition information. Due to the Adirondack region’s close proximity to the Canadian province of Quebec and the subsequent large number of French-speaking visitors to the area, kiosks would be designed to present this information in both English and French, as well as giving directional information in kilometers as well as miles. By providing this type of assistance to travelers along the corridor, the system would help promote the recreation and tourism industries that are vital to the region’s economy.

Three “tiers” of information kiosks would be implemented at various locations along the corridor. Tier 1 Kiosks would be located at rest areas along I-87 to allow travelers to receive real-time information regarding destinations in all tourism promotion areas accessible from
the I-87 corridor. Tier 2 Kiosks would be located at gateways to tourism promotion areas and provide information on destinations within the tourism promotion area that the kiosk services. Tier 3 Kiosks would be located at tourism and recreational destinations and would be used both as the primary source of user-level information received at Tier 1 and Tier 2 Kiosks and to provide travelers with real-time information regarding other destinations within that tourism promotion area.

The system would be implemented in two phases, with one site developed for each tier location during Phase I, and additional sites developed during Phase II. Proposed Phase I sites include the Glens Falls Rest Area (Tier 1), Northway Exit 30 to Route 73 and Lake Placid (Tier 2), and the Adirondack Loj Trailhead or the Garden Trailhead in Keene Valley (Tier 3).

- **Adirondack Tourist Destination Signage Program.** The Adirondack Tourism Destination Signage Program is a system of signing designed to direct travelers along I-87 within the Adirondacks to motorist services and to guide visitors to tourism and recreational destinations and attractions that are associated with a tourism promotion plan. The purpose of the signing is to complement existing tourism promotional efforts with a simple and unified system of signs that will be straightforward for travelers to understand and follow.

The proposed solution would standardize general service signs along State highways and service markers at I-87 exit ramp terminals in the Adirondack region. The establishment of a standardized tourist destination signing system specific to the Adirondack region would complement the existing New York State tourism-oriented signage program and existing scenic byway programs. Like the 3-Tiered Tourist Kiosk System, this signage system would be designed to present information in both English and French and would provide directional information in both miles and kilometers.

The initial phase of the project would involve implementing the signage program along Scenic Route 73 in Essex County. Upon completion and assessment of the success of this initial effort, possible expansion of the program to other routes within the Adirondack region, or in other key recreational and scenic areas within the State will be considered.
Smart/ Safe Traveler Projects Serving Transportation Markets and Customers

In addition to advancing the various Smart Corridor elements established as part of the I-87 Multimodal Corridor Study, each of the on-going and proposed implementation projects and concepts described above also improves the ability of NYSDOT to meet the needs and expectations of its various customer groups. For instance, intercity travelers who regularly travel between the US and Canada would benefit from shorter lines and more efficient operations that would result from increased participation in the NEXUS pre-clearance program. Likewise, the safety of all customer groups approaching the border from northbound I-87 would be improved through an upgrade of the existing queue detection and warning system. The tourist travel market in particular would benefit from projects such as the 3-tiered kiosk system and Adirondack signage program, which were developed as a means to provide visitors to the region’s many tourist and recreation attractions with more comprehensive and easily accessible pre-trip and in-trip information. Finally, improved wireless communication along the Northway is critical for all customers traveling the corridor, as well as for the various law enforcement agencies charged with protecting those travelers.

3.2.4. Strategic Plan - Smart Freight

Several projects and studies that advance the various Smart Freight elements discussed in Section 3.1 are currently being carried out in the I-87 corridor or have been identified as additional projects or concepts for consideration during this Study. These projects are listed in Table 3-4 and are described in further detail below:

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<tr>
<th>Table 3-4</th>
<th>On-Going Projects and Proposed Projects and Concepts: SMART FREIGHT</th>
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<td><strong>On-Going Projects</strong></td>
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<td>• New Baltimore Rest Area and Intermodal Center</td>
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<td>• Truck Stop Electrification</td>
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<td>• Railroad Capital Programs and On-Going Maintenance</td>
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<td>  Also meets Smart Public Transportation elements</td>
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<tr>
<td>• Port of Albany Master Plan and APDC/Albany Industrial Development Agency Waterfront Redevelopment Projects</td>
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<td>• On-Going Intermodal Facility Studies</td>
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<td>• Permanent Vehicle Inspection Station at US-Canada Border</td>
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Proposed Projects and Concepts

- Truck Parking Supply Monitoring
- Safe and Secure Transportation Program Demonstration
  - Also meets Smart Highways and Smart/Safe Traveler elements
- Electronic Seal Screening and Tracking
  - Also meets Smart/Safe Traveler elements
- Kenwood Intermodal Yard Expansion
- Improved Truck Access to “Build Now-NY” Site

A variety of other “long list” initiatives, consistent with the Smart Freight elements, were identified by the Study Team during discussions with transportation agencies, private shippers and other groups in the corridor during Phase I of the study. These include (1) improvements to overall airport infrastructure and the air freight terminal at Albany International Airport (discussed above under Smart Public Transportation); and (2) possible improvements to the highway connections between the Port of Albany and I-87 (in the vicinity of Interchange 23), coupled with possible tandem lots and highway access/egress ramps at that location. Both of these are important activities to further strengthen the State's ability to improve freight mobility, efficiency, and safety in the corridor and will be followed up in future efforts.

Smart Freight: On-Going Projects

- **Port of Excellence.** The Port of Excellence project involves the design and construction of a technologically sophisticated, full-service border crossing facility. The project, originally identified prior to September 11th but expanded substantially in scope since that time, will showcase the fully coordinated operational capabilities of the US and Canada. It will include improvements to border approaches and the construction of facilities on the U.S. side, complemented by improvements on the Canadian side of the border, to accommodate current and anticipated growth in commercial, bus, and vehicular traffic. As such, completion of all phases and facilities at the Port of Excellence is one of the most critical corridor initiatives.

  The “Port of Excellence” project is expected to serve as a model for other border crossings in the US. The project will (1) increase the border crossing's commercial vehicle inspection and processing capacities; (2) improve security and cargo checks for all vehicles; (3) provide secure and comfortable facilities and amenities for employees and customers; (4) redesign the approaches and facilities to accommodate current and anticipated growth in commercial, bus and vehicular traffic; and (5) enhance the ability of the I-87 corridor to function as an international gateway and trade corridor. The initial phases of construction began in 2004, and the targeted completion date for all three phases of the project is 2008.

- **NYSDOT and NYSTA CVO Initiatives.** Both NYSDOT and NYSTA have been actively involved in developing and advancing CVO initiatives within the corridor. NYSDOT continues to improve OSCAR, its single-source registration system that allows motor carriers a single point of contact to apply, change, pay for, and receive the operating credentials for vehicles. NYSDOT has also pilot-tested NORPASS, a multi-state e-screening system for commercial
vehicles, and is currently expanding its promotion of NORPASS. Program activities by both agencies also include rest area improvements, the development of a commercial vehicle inspection station, and the planned application of weigh-in-motion (WIM) and “Virtual” WIM technologies.

- **Marketing of the FAST Program.** Like the NEXUS program, the FAST program helps to enhance border security and facilitate the flow of low-risk commercial vehicles along the corridor through the use of ITS and advanced communications. The level of participation in the FAST program by shippers is relatively low to date, in part because various program elements that would boost its benefits and visibility (especially dedicated by-pass lanes for FAST trucks) are not yet in place. The Canada Border Services Agency, with assistance from its US counterpart, is actively promoting the program with shippers, trucking firms, and shipping organizations to expand enrollment.

- **New Baltimore Rest Area and Intermodal Center.** The NYSTA is presently investigating substantial improvements to its New Baltimore travel plaza between Thruway Interchanges 21A and 21B. The primary purpose of the project would be to expand the range of transportation services available for commercial vehicles, while creating an adjacent intermodal facility to enhance rail-to-truck freight movements.

  The New Baltimore travel plaza is the most utilized facility along the entire Thruway and one of only two that provides simultaneous access to both directions of travel. As a result, the facility sometimes approaches its maximum capacity, and trucks regularly exceed the number of available spaces. The proposed project would provide a new and secure commercial vehicle parking area, including an area for tandem vehicles, and would include a number of repair facilities, truck stop electrification outlets, and numerous amenities and conveniences for drivers. The project would also include highway and rail connections (via adjacent CSX tracks) to several Greene County IDA industrial development sites.

- **Truck Stop Electrification.** NYSTA is also considering the installation of “environmentally friendly” hook-ups to reduce engine idling at a number of its rest areas as part of its Truck Stop Electrification (TSE) pilot project, presently being tested at NYSTA’s Dewitt and Chittenango travel plazas. NYSTA and the NYS Energy Research and Development Authority (NYSERDA) are also carrying out a similar pilot project with a private truck stop operator on Ballard Road in Wilton, NY near Exit 16 of the Northway – a public-private partnership effort that could be expanded to similar facilities along the corridor. The electrification program looks to address the energy, environmental and operating
costs of the approximately 1,830 hours that the typical truck sleeper cab idles each year.5 This program is in line with the overall Study goals, and with similar efforts across the country to provide ways to meet truck rest area needs that are energy-efficient, minimize pollution, and are cost-efficient for truck freight operations.

- **Railroad Capital Programs and On-Going Maintenance.** Both CP Rail and CSX, in partnership with NYSDOT, have ongoing capital improvement programs to enhance the operating conditions and reliability of their networks. Many of the improvements that are scheduled for the railroads include traditional maintenance and upgrades that reduce or prevent “slow orders,” where trains are forced to operate at slow speeds due to poor track conditions or signal system limitations.

Building on a May 2002 Memorandum of Understanding signed by Governor Pataki and Quebec’s Premier Bernard Landry to strengthen the economic ties between New York and Quebec, NYSDOT and CP Rail have agreed on an $18 million track and signal improvement program between Schenectady and Rouses Point, New York. Primarily on the Canadian Main Line, this program is scheduled for completion by the end of 2005. The goals of the program are to reduce long term speed restrictions at 10 or more locations along the corridor; improve passenger and freight train safety and on-time performance; increase operating speeds to over 65 MPH on the passenger corridor; and reduce passenger train delays caused by freight trains. These will include upgrades to signals, communications infrastructure and related facilities to reduce passenger and freight train delays due to signal failures. Improvements to the radio voice communication system will also increase train safety, as will actions to upgrade signal system reliability at automated grade crossings. Further, track and control system upgrades at the Saratoga Station will reduce passenger train running times, allow northbound and southbound passenger trains to be in the station at the same time without affecting the main track, and reduce interference between passenger train operations and freight switching operations in Saratoga Yard. Finally, these CP Rail programs also include improving vertical clearances along the Canadian Main Line by mid-2005 to permit 20’ - 2” double-stack container cars in the corridor.

In addition, all of the railroads in the study area currently have on-going projects that address maintenance of their lines. These maintenance projects primarily focus on keeping the infrastructure in satisfactory condition. Future and on-going projects include double track and grade separation projects between Rensselaer and Schenectady, to be completed by NYSDOT in conjunction with Amtrak, to address critical bottlenecks that affect both passenger and freight operations, as well as CP Rail’s $3.5 million clearance improvement project along the Canadian Main Line noted above. Other potential double-track projects to correct bottlenecks between Schenectady and Rouses Point have been identified by NYSDOT and CP Rail but are not presently funded. However, two by-pass tracks – at Willsboro/Chesterfield and at Rouses Point (which will also include a new interlocking) – will help address the frequent delay problems inherent in this type of single-track system.

NYSDOT is working with Amtrak and CP Rail on a bypass of the Mohawk rail yard in Schenectady County and various track improvements at the Saratoga Yard in Saratoga Springs. In addition, a Vehicle and Cargo Inspection System (VACIS), a gamma-ray

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scanning system that captures images of the contents of cargo containers, was recently installed at the US-Canada border crossing at Rouses Point.

- **Port of Albany and Waterfront Redevelopment Efforts.** The Albany Port District Commission’s 2000 update to its Port Master Plan made a comprehensive assessment of the existing infrastructure conditions and needs at the Port of Albany/Rensselaer and identified areas in which changes in port layout, facilities, operations, and equipment were required to address market needs. The main findings and recommendations of that report (*Port 2000 Expanding the Reach of the Port of Albany/Rensselaer* - hereafter the “Port 2000 Master Plan”) called for: improved container-handling operations, including the need for better mobile crane equipment; expanded container storage yard; access to at least two container transfer facilities (to truck or rail); access to all nearby Class 1 railroads; a new bulk storage area near a marine berth; and a warehouse distribution center. More efficient use of its waterside space was also planned, for both waterborne and rail freight uses, as well as the dredging of various nearby portions of the Hudson River to improve the navigation of ships heading into and out of the port. Better access to both I-787 and I-87, and more efficient links to the local roadway system are also called for in the Master Plan and were reiterated in the Study Team’s discussions with port personnel.

Although not related to waterborne freight, the City of Albany has identified segments of the Hudson River waterfront for potential recreational purposes and residential/commercial development, and the Albany Port District Commission (APDC) and the Albany Industrial Development Agency are partnering to raise $4.4 million in bonds to complete a waterfront development project. The City of Albany and the Albany Port District Commission are working together to ensure that uses minimize conflict and maximize development opportunities. These actions are consistent with the expanded recreational use of the State’s many rivers and canals.

The New York State Canal Corporation (NYSCC), a subsidiary of the New York State Thruway Authority, has also committed $167 million over the last five years to major rehabilitation and revitalization projects along the 524-mile Canal System, including major harbor revitalization projects in Waterford and Whitehall. The program also includes upgrades to the historic Canalway Trail (currently 40% of the trail system is complete), with pedestrian connections to adjacent communities, which when completed will be one of the most extensive trail networks in the US. Like the Albany projects mentioned above, the bulk of these improvements reflect the push to enhance the use of this system as a heritage tourism resource, with incentives for public-private partnerships to take more advantage of the system’s economic development and tourism potential.

- **On-Going Intermodal Facility Studies.** As discussed earlier in this section, highway access improvements and runway and terminal expansion projects are underway at Stewart and Albany International Airports, both of which provide air-to-truck intermodal operations. There are also several on-going studies of potential water-to-rail, water-to-truck, and rail-to-truck intermodal sites in the Capital District, as well as a variety of related initiatives to support or improve intermodal activity along the corridor. The status of these projects is as follows:

  - **Saratoga County Distribution Facility.** A warehouse distribution intermodal facility in Saratoga County is in the very early phases of pre-feasibility investigations. Currently,
there are no approved plans or programs to advance this concept, with this location viewed as a possible base facility for “CP Express” intermodal rail container service between the Capital District and both Montreal and the New York City area.

- **Plattsburgh Yard Relocation.** Plans to relocate the existing tracks at the Plattsburgh Yard facility away from the Lake Champlain waterfront are currently in the design development phase and would be implemented through state funding sources. Relocating the yard to the Bluff Point Yard south of the current location would provide additional space for intermodal operations than is currently available at the existing downtown site, as well as allow for the redevelopment of portions of the Plattsburgh waterfront.

- **Greene County IDA/New Baltimore Intermodal Facility.** This planned intermodal facility, discussed earlier under on-going freight studies, is being sponsored by the Greene County Industrial Development Agency (IDA) at the New Baltimore travel service plaza on the Thruway. This project is presently advancing through the Generic Environmental Impact Statement (GEIS) process. One of the two parcels (on the west side of the Thruway) that the Greene County IDA has identified is a designated Build Now-NY site. (The Build Now-NY program of the Empire State Development Corporation helps identify and prepare sites so they are ready for development when the opportunity arises, with a focus on high technology manufacturing, distribution/logistics/e-commerce facilities, and multi-tenant business and technology parks.)

- **Capital District Commercial Vehicle Parking Lot.** Development of a dedicated and secure commercial vehicle parking lot and staging area is currently being studied by the NYSTA under a separate initiative. The eventual site would replace the existing tandem lot at Exit 23, and possibly the tandem lot at Exit 24, to improve both efficiency and safety. As noted earlier, the development of tandem lots at the Port of Albany has also been considered, in combination with improved access to the port’s adjacent highways and local street system.

- **Selkirk Yard Containerized Freight Intermodal Upgrades.** Improvements to the CSX-owned and operated Selkirk Yard are focused on maximizing the efficiency of this facility to support its existing automobile distribution capabilities. CSX has evaluated the benefit of investing in the Selkirk Yard for the purposes of improving containerized intermodal commerce and determined that its strong presence in the corridor from its DeWitt, New York and West Springfield, Massachusetts terminals adequately services its needs in the corridor. The CSX business plan does not at this time include any investments in Selkirk for the purposes of improving containerized freight handling. NYSDOT also has an on-going project to evaluate improved access between I-87 and Route 9W, which among other local traffic benefits would provide more direct access to the Selkirk Yard.

- **Permanent Truck Inspection Station at US-Canada Border.** NYSDOT is advancing a permanent commercial vehicle facility directly south of the Port of Excellence. Development of a permanent inspection facility at the border is a key to the overall program by NYSDOT and NYS Police for statewide truck safety, credentialing and weight enforcement efforts. With its state-of-the-art ITS/CVO technologies to lower the public and private costs of this
important freight management task, and its location at the border, this facility will complement the Port of Excellence project.

The permanent facility would be located north of the first southbound exit from the Northway, thereby precluding any trucks from avoiding the facility. The inability of truckers to by-pass this location would also increase their incentive to remain within legal weight limits and to participate in the OSCAR and NORPASS programs through which the proposed operation will permit pre-qualified trucks to avoid being stopped. Its close tie-in with Port of Excellence operations and the MTQ border facility will allow for operational efficiencies and a much higher enforcement rate than is possible under present systems.

**Smart Freight: Proposed Projects and Concepts**

- **Truck Parking Supply Monitoring.** The proposed truck parking supply monitoring system would use available ITS technologies to record incoming and out-going commercial vehicles at truck parking areas at the High Peaks and New Baltimore rest areas, determine the availability of parking spaces and provide that information to travelers via upstream variable message signs (VMS) or other information distribution means (e.g., Highway Advisory Radio, information kiosks) via connections to the State’s IEN. The system also has the option of identifying individual trucks (via license plate readers) for credentialing checks or homeland security purposes.

This system is consistent with both State and national goals for truck rest areas in terms of providing real-time information on parking supply availability. It also provides another tool to help the State address the safety issues associated with trucks parking on highway ramps and shoulders when parking capacity at rest areas is exceeded.

- **NYS Safe and Secure Transportation Demonstration Program (NYS-SSTP).** The goal of this program is to integrate the advanced supply chain security technologies and processes being implemented by private shippers, the on-going Federal government programs (e.g., FAST) to expedite international shipments, and New York State’s vehicle, regulatory, and safety monitoring requirements. The demonstration of this system in the I-87 corridor would help to increase the public-private partnering that is essential to more efficient, lower-cost shipment processing, and increase the rate at which goods flow through the corridor.

For example, as a shipment arrives at the Champlain border crossing, the system’s security component would track the container or trailer and provide real-time location information to CBP personnel that the shipment has entered the FAST lane queue. Truck vehicle operation and driver information obtained early in the logistic process, through OSCAR, NORPASS, or other systems, would be transferred to the secure network and maintained with the security information to facilitate border crossing and, later, vehicle inspections. NYSDOT, NYS Police, and others involved at truck inspections check points would be notified of the vehicle’s location and status. Trucks meeting NYSDOT operating requirements could then bypass those check points.

Under high “Alert Level” conditions, trucks fully equipped and participating in the NYS-SSTP would flow more freely, especially at border crossings, while others would face increased
delays. Under prolonged high-alert levels, NYS-SSTP could help maintain vital commercial freight movements, as commercial border crossing traffic follows the path of least resistance. Longer term, as major shippers begin to utilize the corridor, related support and commercial infrastructure would be required to handle the increased movements. Major retailers, shippers, and manufacturers would view the corridor as an important element of cost-effective supply chain viability, potentially leading to increased investment in existing or future facilities located along the corridor. The same elements would be useful at other border crossings within the State, as well as at crossings nationwide.

This program takes the trend toward greater public-private partnership in homeland security to another level by combining the “supply chain” efforts of major private shippers with the State and Federal actions to improve customs inspection efforts, expedite low-risk shipments and reduce the public and private costs of vehicle inspections and credentialing. The demonstration would allow coordination between existing agency efforts such as FAST and NORPASS and private shippers’ systems that electronically track goods from point of manufacturing to point of sale, and reduce the need for trucks to have multiple transponders to cover the myriad programs for homeland security, e-credentialing for truck inspection, toll payments and shipment tracking.

The key to expedited freight movement in the corridor, from reduced border delays to fewer truck inspections, while maintaining homeland security and highway safety, is better coordination among government agency programs and greater private-public cooperation. The proposed Safe and Secure Transportation Demonstration project represents a solid action to help achieve both of these goals.

- **Electronic Seal Screening and Tracking.** The electronic cargo seal screening and tracking system is an electronic screening network to track agricultural in-bond shipments along pre-designated trade corridor routes. In-bond containerized shipments are sealed cargo containers which cannot legally be opened in the US. The proposed system would provide carrier identity, as well as vehicle, driver, container, and manifest information for in-bond agricultural shipments imported through the US, traveling through New York and destined for Canada. A real-time update about the status and progress of the electronic seals affixed to in-bond agricultural cargo containers can be verified at key locations along designated trade routes and at Commercial Vehicle Information Systems and Networks (CVISN) inspection stations. This proposal would add two new components – the application of electronic seals and the ability to monitor and extract information from the electronic seals - to the existing NYSDOT commercial vehicle electronic screening system.

- **Kenwood Intermodal Yard.** The expansion of CP Rail’s intermodal terminal at Kenwood Yard would complement the on-going vertical clearance projects along CP Rail’s Canadian Mainline and address the subsequent need for expanded intermodal opportunities in the corridor. The primary goal of this project is to increase the capacity and productivity of the existing facility to promote intermodal freight growth in the Capital District. The project includes track and yard improvements that will increase the processing rate of intermodal freight through the yards, allowing the yard to capture a greater portion of the potential intermodal market in the Capital District. The benefits of this initiative would be further amplified if needed improvements to CP Rail’s Canadian Main Line are completed. Those improvements are discussed in Section 2.3.3 (Rail Networks and Operations).
• **Improved Truck Access to “Build Now-NY” Site.** Warren County Route 28 (Corinth Road) is the primary east-west arterial providing access between I-87 at Exit 18 in the Town of Queensbury and the City of Glens Falls. This corridor is considered one of the most congested corridors in the Glens Falls area. In 1999, Governor Pataki announced the designation of the Northway Business Park in the Town of Queensbury as a “Build Now-NY” site within the Warren County Empire Zone. The 40-acre Northway Business Park site, designated for light industrial uses, is located just slightly to the northeast of Exit 18 on Luzerne Road. The State’s Build Now-NY program prepares sites to be ready for development when the opportunity arises, and focus on the types of high technology and business park projects being considered at these sites in Warren County.

This project would construct a new north-south connector road parallel to I-87 between Corinth Road and Luzerne Road. This project will result in more direct access to the Northway Business Park “Build Now-NY” site from I-87 at Exit 18, while relieving congestion in the Warren County Route 28 (Corinth Road) corridor.

**Smart Freight Serving Transportation Markets and Customers**

In addition to advancing the various Smart Corridor elements established as part of the I-87 Multimodal Corridor Study, each of the on-going and proposed implementation projects described above also improves the ability of NYSDOT to meet the needs and expectations of its various customer groups. By definition, all of these “Smart Freight” projects have been developed to support New York State’s trade market, but the implementation of many of these projects would benefit other customer groups in the corridor as well. For instance, travel times for all passenger trips via rail—be they commuter trips or longer intercity trips—would be reduced as a result of the various infrastructure improvements currently being implemented by the corridor’s freight railroads. Visitors to the region would take advantage of the various waterfront redevelopment projects being advanced along the Albany riverfront or the canals along the corridor. Finally, commuter and intercity trips made by car would benefit from projects such as the Kenwood Intermodal Yard expansion that encourage more freight to be moved via other modes, or roadway improvement projects such as the proposed connector road adjacent to the “Build Now-NY” site at Exit 18.

**3.2.5. Relationship to Smart Corridor Elements**

Section 3.1 presented the overall vision for the development of a Smart I-87 Corridor, the four areas in which this overall vision would be sought, and the more specific elements that would enable those visions to be met. Table 3-5 summarizes how the on-going initiatives and proposed implementation projects identified throughout this section match up with these elements. As was clear in the various discussions in this section, many of the actions cut across a number of areas, providing support in more than one area. Other actions, while not directly assignable to any of Smart Corridor elements defined in Section 3.1, are still consistent with the overall Smart Corridor vision, and with transportation and economic development goals of the I-87 Multimodal Corridor Study presented in Section 2.3.

This section has laid out the relative merits for a broad range of possible actions, including the rationale for their implementation and the benefits they would provide. Many of these areas reflect the recent state of transportation technology and do not and cannot reflect where things will be in 20 to 30 years. The next section attempts to look at this longer-term view, and provides some ways that NYSDOT and others can best move in those directions.
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<th>Table 3-5</th>
<th>On-Going and Proposed Implementation Projects and Concepts to Meet Smart Goals</th>
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<td>Smart Highways Elements</td>
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<td>H-2: Creation of Smart Networks</td>
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<td>H-3: Support for Transit Modes Within Highway Planning</td>
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<td>H-4: Smart Highway Capacity</td>
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<td>P-1: Build on Empire Service Success</td>
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<td>P-2a: Enhance Existing Transit Routes</td>
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<td>P-2b: Integration of Smart Transit with Smart Highway Plan</td>
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<td>P-3: Comprehensive Pre-Trip and In-Trip Traveler Communication</td>
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<td>P-4: Expand Transit Awareness</td>
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<td>S-1: Comprehensive Pre-Trip and In-Trip Traveler Communication</td>
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<td>S-2: Expanded Collection and Sharing of Data Among Agencies</td>
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<td>S-3: Expanded Marketing and Education to Increase Usage</td>
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<td>F-1: Expand Public-Private Partnerships</td>
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<td>F-2: Continued State, Federal, and International Coordination</td>
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<td>F-3: Incorporate Safety and Security in Freight Planning</td>
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<td>F-4: Enhance CVO Capabilities</td>
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<tr>
<td>F-5: Expanded Use of Rail Freight</td>
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**Smart Highways**

- NYSDOT and NYSTA Capital Highway Program
- I-87 Interchange and Access Improvements [1]
- Tappan Zee Bridge/I-287 Corridor Study

**Smart Public Transportation**

- NYSDOT and NYSTA ITS Programs
- I-87/Route 9 Closed-Loop Traffic Control System
- Exit 20 Improved Access and Queue Detection

**Smart/ Safe Traveler**

- Route 5 Signal Override Study
- Stewart International Airport Transit Access Study
- Plattsburgh International Airport [1]
- Commercial and General Aviation Improvements [1]
- Adirondack Rail Corridor Service Improvements
- Marketing of NEXUS Program
- New York State Transportation Federation Travel Information Gateway
- Improved Wireless Communication on the Nor
day
- Expanded Queue Detection and Warning System at the US-Canada Border

**Smart Freight Elements**

- Enhanced Use of Rail Freight
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<th>Table 3-5</th>
<th>On-Going and Proposed Implementation Projects and Concepts to Meet Smart Goals</th>
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3-Tiered Tourist Kiosk System
Adirondack Tourist Destination Signage Program

**Smart Freight**
- Port of Excellence
- NYSDOT and NYSTA CVO Initiatives
- Marketing of FAST Program
- New Baltimore Rest Area and Intermodal Center
- Truck Stop Electrification
- Railroad Capital Programs and On-Going Maintenance
- Port of Albany and Waterfront Redevelopment Efforts
- On-going Intermodal Facility Studies
- Truck Parking Supply Monitoring
- Permanent Truck Inspection Station at US-Canada Border
- NYS Safe and Secure Transportation Demonstration Program
- Electronic Seal Screening and Tracking
- Kenwood Intermodal Yard Expansion
- Improved Truck Access to “Build Now-NY” Site [1]

[1] Does not match up with any of the specific “Smart” goals but is fully consistent with the overall goals of the I-87 Multimodal Corridor Study.
4 looks at the various Strategic Plan components discussed in this section, and identifies the “Next Steps” that transportation agencies, shippers, freight carriers and others will need to take in order to get the overall Smart Corridor agenda moving.

3.3. Long Term Vision

3.3.1. Overview: The IT Future

The previous sections of this report summarize the results of previous phases of the Study, present the overall “Smart” vision for the corridor, and lay out the more detailed elements needed to achieve that vision. These include projects and concepts for implementation in the areas of Smart Highways, Smart/Safe Traveler, Smart Freight, and Smart Public Transportation - and the elements of the Corridor Strategic Plan required to work toward them. These plan elements reflect the Study’s assessment of corridor needs, both existing and those projected for the future, and effective ways to meet them. They also reflect an understanding of existing transportation technologies and expectations about how those technologies will be used in the future, and what new ones will arrive to supplant them.

At the 1939 Worlds Fair in New York City, the General Motors “Futurama” exhibit presented a transportation world of the future. The “future” imagined by the exhibit was the year 1960, a time when transportation demands in urban areas would be met by vast vertical intersections, huge above- and below-ground highways, and parking garages hidden by parks. It was part of a “Highways and Horizons” exhibition by the then-world’s largest auto manufacturer that envisioned a transportation future built around the private auto, albeit through “radio controlled” operation of those private autos.

The I-87 Multimodal Corridor Study confirmed, among other things, that 65 years later we’re still a long way from “radio controlled” cars and highways, and that to a great extent we need to provide greater support for many of the freight, land use, and public transit concepts that were predicted in 1939 (higher land use density in proximity to public transit, greater use of rail freight and public transit, etc). The key to the future that this Study has defined, however, is not simply a recipe of physical highway improvements and land use strategies, but rather a fundamental reliance on the same thing that has driven the high-tech explosion of the last 20 years - information technology (IT).

Advanced IT systems allow agencies to collect the right information and use it to design and to effectively and efficiently operate and maintain the transportation system, so that both agencies and their customers can in turn make better decisions. A Smart Corridor needs strategic IT investments that will increase efficiencies by getting higher effective capacity from existing and new systems, and fostering economic growth and competitiveness without massive facility investments. It involves creating a backbone that can provide ubiquitous, high-capacity communications connections for all customers, with specific added functions to support various customer groups (e.g., truck operators, tourists, intercity passengers). Movement among modes should be seamless and customer-friendly. Worldwide, this is a common theme. The major
questions are what investments should be made, in which technologies, and when and how these actions should occur.

In a two-dimensional sense, IT applications support various transportation customers or activities (shown as the columns in Figure 3-1), and include a range of existing and future technologies to meet these needs (shown as rows in that chart). The differences in color intensity indicate how much emphasis has been given to a particular cell - for instance, how much RFID technologies are used to support, say, local commuter travel, or the extent to which web access technologies are used to support tourist information programs. Figure 3-1 provides a sense of where the I-87 corridor is presently in terms of the use of technologies to support various kinds of transportation activities, with the different color shadings representing the various degrees of the use of the technologies in the corridor. Technologies already in common use in support of a given transportation system (e.g., “Web Access Technologies” for “Transit System User Support”) are shown as “high,” while technologies with little or no current use in a given market area are shaded “low.” While this matrix indicates some leading technologies and highlights major important aspects of the transportation system, it is not intended to be a comprehensive listing.

The proposed projects and concepts identified in Section 3.2 are dominated by “jump start” actions to get existing technologies more widely applied or tested in their first application. However, NYSDOT and other agencies also need a longer-term strategic plan – a roadmap for long term investments, both physical (e.g., highways) and IT, including strategic alliances with the right public and private sector partners.

A Long Term Strategic Plan requires three elements:

- an accurate assessment of existing and projected future conditions and capabilities;
- a plan for short-term investments of proven technologies that will advance those capabilities in strategic directions to address needs; and
- a plan to explore ideas and technologies that might be useful in more effectively, efficiently, safely, and expeditiously enhancing the system’s performance.

The I-87 Multimodal Corridor Study has attempted to identify the necessary information to respond to the first two elements, including a number of short-term priority investments. The third area is the most difficult to define. What future technologies will be available? What technologies will be practicable to apply? What technologies will gain customer acceptance and practice? The remainder of this section identifies elements needed to address this third area, including some programs that are already underway and others that need to be implemented, following the same four “Smart” corridor elements used previously in this report.

3.3.2. Smart Highways

The development of Smart Highways is one of the four focal points for future investments in the I-87 corridor. As noted in Section 3.1, Smart Highways require greater agency integration, smart networks, the inclusion of transit in highway planning, and the creation of smart capacity.

Greater agency integration in the corridor includes present and proposed efforts in the areas of Homeland Security vehicle information (e.g., location and tracking of specified vehicles) and traffic incident management. Coordination among agencies will improve in the future as 9-1-1 emergency response-type services mature, homeland security becomes a more pervasive
### Figure 3-1
Present IT Applications

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Degree of Correlation:
- **high**
- **medium**
- **low**
- **None**
emphasis, and technologies like computer-aided dispatching become more prevalent in day-to-day transportation system management.\textsuperscript{6} Particularly useful initiatives will capitalize on new ways of operation made possible by technological innovations like the Wireless Fidelity, or “Wi-Fi,” services being provided by cellular telephone companies,\textsuperscript{7} which allow users wireless access to the Internet.

Smart networks continue to emerge throughout the US, although still on a limited basis. The Study has documented how NYSDOT, NYSTA, and others are using information to predict the short-term status of a highway system in real time. For instance, these agencies can use E-ZPass transponder readers to collect travel time data and pavement probes to monitor icing conditions; they can then use VMS and HAR to instruct drivers along the affected roadways; and use the same data to direct construction, maintenance, and emergency response. Improved Wi-Fi services will have an expanding impact in this area (e.g., existing services that automatically call commuters’ cell phones with updates on their individual commuter routes). Several related concepts of possible long term application include:

- **Advanced Location and Traveler Information Services via Cell Phones.** A high percentage of motorists carry cell phones but no systems are available along the corridor to take advantage of their communications potential. Federal Communications Commission regulations require cell phone operators to be able to locate cell phone callers making 911 calls. The latest generation of cell phones will therefore be able to identify the phone’s location, which advanced systems could use to provide real-time location-specific information on weather, traffic conditions, alternate routes/detours, turn-by-turn driving directions, and related points-of-interest (hotels, hospitals, restaurants, cultural attractions, local events, ATMs, police, etc.). Information can be provided in graphic, text, or audio formats. The collected cell phone location data can help assess real-time traffic flow and detect congestion and potential incident locations – the same concept behind the TRANSMIT system.

- **Radio Broadcast Data System/ Radio Data System (RBDS/ RDS).** RBDS/RDS can use a portion of the FM signal to provide information to travelers on weather conditions, accident or construction delays, directions to major events, etc. through their cars’ FM radios. Most car radios in Europe are equipped with RBDS/RDS capability, and the number in the U.S. increases as the fleet turns over. Its widespread use by broadcasters in the United States has been delayed by a lack of direction as to how it might be best used. For radio stations and their listeners, this type of system can provide a wide range of programming information and services – e.g., identify each radio service in the reception area and what each offers (e.g. news, rock, etc.) or enable a radio to automatically find another station playing the same material. However, this same technology could also provide I-87 corridor travelers with important information on traffic, including letting drivers know when such announcements are actually on the air, and providing the announcements in the listener’s own language. The technology could be particularly critical in isolated rural areas where such information is often most needed, and in areas with a strong need for multi-lingual messages.


\textsuperscript{7} Wi-Fi Alliance, July 31, 2004, http://www.wi-fi.org
Micro-scale sensors can provide agencies and their customers with an even higher level of low-cost observability of system operations. Their availability is only a few years off. Using MEMS (micro electro-mechanical systems) technology, agencies can fully “instrument” large sections of highway or bridges, providing a continuous and comprehensive assessment of the facility’s status. Sensors both detect local conditions and relay information from other sensors, forming an ad hoc network. The I-87 corridor is ideal for this kind of sensor technology, which can observe remote locations where video instrumentation is too expensive but low bandwidth communication access is possible, using Wi-Fi to pass data to the operating agencies. At the same time, low-cost digital video technologies will also make it possible to achieve visual observability of system status. A project in Virginia is demonstrating that there are systems that can be installed at reasonable costs to monitor remote locations. This type of system would be ideal to install along with call boxes along the Northway (see discussion in Section 3.2.3.1 about dealing with improved communications along the Northway).

The inclusion of transit within highway planning shifts the mobility emphasis appropriately to servicing people instead of vehicles, measuring effectiveness in terms of persons per highway lane instead of vehicles per lane. Often, this involves simple ideas like subscription bus service. Subscription bus services would be a natural fit along much of the I-87 corridor, with employment growth expanding in suburban areas. Automatic vehicle location (AVL), Wi-Fi technology, and other forms of communication enhance service by making the location and status of the buses visible to all, so customers and operators can make better travel, vehicle routing, and related service decisions.

Smart capacity involves the use of facilities, in a strategic way, to achieve maximum productivity under all operating conditions, good and bad. In Europe, for example, this means using advanced communication systems to provide guidance to drivers about weather or accidents to ensure that maximum throughput is achieved (e.g., limit lane changing, consider alternate route). On the Autobahn in Germany, for example, there are roadside sensors that collect weather and traffic data every 60 seconds. Once these data are collected, the VMS along the highway are automatically changed to notify drivers about traffic incidents, necessary lane changes or adjustments to speed limits. Further, these sensors determine the percentage of trucks on the highway, and when it exceeds 15% and vehicle speeds drop below 80 km/hour, the VMS indicate that unnecessary lane changes should be avoided. Also, when the sensors detect poor weather conditions, speed limits are reduced according to the condition’s severity.

Especially in the Capital District, where the level of observability is increasing and travel advisories can be distributed, the use of such management techniques should be possible in the future. Some of the proposed projects and concepts discussed in Section 3.2.1 would push highway operations further in this direction.

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Smart capacity also means focusing on persons per hour, rather than vehicles per hour, as a measure of throughput, encouraging preferential treatment for high occupancy vehicles. This includes pricing strategies that encourage the use of transit, car pools, and other high occupancy vehicles during times of peak demand. Especially in places like the Capital District, where sharp peaks in demand occur and ridesharing is part of the culture, such pricing ideas should be fruitful to pursue. A couple of percentage points of reduction in demand can help ensure that system breakdowns do not occur. Although some US highways are currently tolled, most remain free, and transportation customers in the US have historically been opposed to tolls. Pricing does raise funds, but it also manages capacity, offering customers the option to pay with money or pay with delay on a given trip. This High-Occupancy/Toll (HOT) lane concept, which was discussed in Section 3.2, is an example of the type of paradigm shift that true Smart capacity will require. It has already taken hold in some transport markets - customers are used to cheaper flights on weekends and off-peak train fares, some bridge tolls are cheaper at various times of the day and week (e.g., Port Authority of New York and New Jersey crossings), and HOT lanes are in operation in California, Canada and elsewhere around the world.

Homeland Security objectives can also benefit from the kinds of instrumentation ideas described above. Homeland Security can tie information from security databases with data from the local corridor databases to do things like check on freight, vehicles, and drivers at border crossings. Homeland Security can also use messages generated from the Smart Corridor as feedback to its planning and design of security monitoring and checking systems. The Safe and Secure Transportation demonstration proposed in Section 3.2.4.1 looks to combine Homeland Security, Customs, and CVO systems and private “supply chain” databases in a similar manner.

3.3.3. Smart Public Transportation

In the near-term, Smart Public Transportation elements in the I-87 corridor include enhanced intercity rail services, expanded rail service coverage, improved rail infrastructure including high-speed rail facilities, and better management of existing local bus operations.

The I-87 corridor presents many opportunities to focus on Smart Public Transportation. The strategic position of Albany, within New York State as well as the region, and the significant rail investments that have already been made, motivate and reinforce continued investment in faster, better, and more frequent rail service between Albany and New York City as well as to points further north and further west.

Earlier NYSDOT studies of the I-87 corridor suggested that building on passenger rail service in the Poughkeepsie-Albany area would generate more economic activity in that area, and that commuter rail service might work between Albany and Saratoga to tie those important economic areas together to relieve congestion on I-87, I-90, and key arterials. These ideas were considered further in the I-87 Multimodal Corridor Study, and improvements to Albany-Saratoga service, and in the overall Empire-Adirondack corridor, were identified. The eventual

goal would be to make the Capital District-New York City corridor economy more akin to the
Boston-New York or New York-Washington, DC segments along Amtrak’s Northeast Corridor,
with more frequent rail service and faster trains bringing communities 100 to 150 miles from
Manhattan into reasonable business travel time.

Of course, such service expansions and improvements will be far more valuable if they are
accompanied by IT investments that improve observability for the customers and for the
operators. This means using AVL and automatic vehicle identification (AVI) technologies so that
the location and status of trains can be seen by the traveling public. It means putting such
information in the hands of the rail system operators so that better decisions can be made
about the operation of the system, especially the coordination of services, within a given agency
and between and among the public transportation and private freight services in the corridor.
Section 3.2.2 discussed advanced signal systems using GPS-based AVL technologies, providing
many of these observability benefits.

It is interesting to note that, as these systems exist today, it is impossible to plan door-to-door
public transportation trips via the Internet. Even though one can plan airline trips to anywhere
in the world, the corridor’s regional public transportation schedules cannot be chained together
to get from one location to another. Many potential transit customers are lost because they
don’t know about the services available. The service schedules for carriers like Metro-North
Railroad, NYC Transit, the Long Island Rail Road, and NJ Transit are not accessible in one place,
nor are they tied together, like different airlines, so that integrated trips can be planned. This
strongly suggests the need for a website in which these service schedules are all accessible and
where multi-carrier trips can be planned. TRANSCOM’s TRIPS 123 service, soon to be available
in the greater New York City area, will provide this type of functionality, and similar efforts have
been discussed for the Capital District.

Attention should also be paid to other public transportation modes, including expanding IT-
enhanced subscription bus services as described above, and improving commuter air and
intercity bus services. It is not sufficient to just expand these services as they exist today;
significant IT innovations and agency coordination efforts must be introduced to make such
services more attractive to customers and efficient to operate.

3.3.4. Smart/Safe Traveler

In the area of Smart/Safe Traveler initiatives, identified elements include improved pre-trip and
in-trip traveler information systems, expanded collection and sharing of data, and enhanced
safety through better detection and information systems.

The wireless ATIS project presently underway in the I-90 test corridor\textsuperscript{12} is an example of where
this technology is headed. GPS units have been combined with an in-vehicle navigation system
and Wi-Fi cellular telephone service to connect the traveler to real-time travel information while
using information about the vehicle’s location and speed to monitor traffic conditions. In 10-20
years, it is likely that all new automobiles will be equipped with this kind of in-vehicle navigation
system and that vehicle-based two-way communication with the outside world, via the web, will
be commonplace. The I-87 corridor needs to prepare for this future. Projects should be
undertaken that enable similar technologies to be implemented where it is economical to do so.

\textsuperscript{12} See Footnote 6 above.
The Smart Traveler goal involves seamless connectivity between the traveler and the outside world, allowing destinations to be found, routes to be chosen, and coordination with other people and activities. The lack of cellular phone service in portions of the I-87 corridor makes this objective a challenge, especially in the Adirondacks. The proposal to fill this communications gap along the Northway portion of I-87 is identified as an important Smart/Safe Traveler project in Section 3.2.3.1 of this report. Filling similar gaps or solving these problems with other technological innovations should be a major focal point of both corridor investments and technological research.

The Smart Corridor needs to connect the user to a wide variety of support services in a digital and seamless manner. The assistance is primarily information-based, but also involves service facilities expressly designed for the users on the Smart Corridor. The technology can be described as “personal information-transaction portals” supplemented by general access “telematics stations.” The personal portals connect Smart Corridor users to the outside world via the web. They turn the users into e-business customers able to find goods and services in the Corridor or anywhere in the world. The supplementary telematics stations can then be used to get the same kind of access to the web.

But travelers must first and foremost be Safe Travelers. The transportation customer expects a safe trip and wants assurances that it will be so wherever he or she is in the transportation system. To do this, the system has to monitor its condition and status, assure protection against dangerous situations, and provide immediate and effective emergency response when incidents occur. Wireless, ubiquitous ATIS (e.g., via systems like GM’s OnStar service) is one way in which all or most of these services can be provided. It seems logical that as such services mature and expand, their ability to meet these needs will continue to improve.

The remoteness of the upper reaches of the I-87 corridor makes it challenging to provide such safety-related services. As with the Smart Traveler discussion above, technological innovations that produce uninterruptible connectivity to the information network are at the heart of success with these safety objectives. Hence, it is of critical importance that such technological solutions be found, or developed if they do not exist, and deployed, on a showcase basis, and then permanently, so that the safest possible travel can be assured.

3.3.5. Smart Freight

The notion of creating a Smart Freight environment in the corridor implies expanded truck inspection technology and facilities, greater use of private-public partnerships, expanded rail freight and intermodal services, and the incorporation of safety and security features. The latest word in the freight IT world is “visibility,” a situation where the condition, location, and status of a shipment can continuously be determined. They depart and arrive on time and never miss an intermodal or intramodal connection. The shipments “talk” to the world and ask for “help” if suitable environmental conditions are jeopardized, including any anomalies in the way it's being handled or routed. It is also freight that can affirm at a border crossing or vehicle inspection station that permission to cross international boundaries or pass by a State inspection station has been pre-secured.
The Safe and Secure Transportation Program demonstration program, as described in Section 3.2.4 of this report, seeks to combine all of these functions together, combining and building on public and private sector systems already in place or in the early stages of deployment. The primary challenge is how to recognize automatically and non-intrusively the particular users and user activities in the Corridor. The rest of the information tasks can be satisfied through standard channels (e.g., Web services providers, mobile computing systems, and satellite-based telecommunications networks) using regular enterprise databases and business processes. The SSTP demonstration incorporates the use of Radio Frequency Identifier (RFID) technology, tied constantly and proactively into a protected information network. RFID is likely to become “the way of the world,” integrated into personal items (e.g., driver's licenses, passports, and PDAs) as well as commercial products and packaging. This evolution has far-reaching significance, as it implies a fully interconnected world.

The Just-in-Time (JIT) model of manufacturing and high-velocity inventory and warehousing conceptualizes highways and railroads as the material handling system among factories and enterprises. If JIT is achieved, enterprises can rely on transport carriers as part of their inventory “chain,” delivering materials and products reliably and safely. Because logistics costs represent more than 60 percent of total transportation costs for manufacturers, reducing inventory and warehousing costs through JIT can result in significant savings. This savings in logistics is the key to economic growth in the global economy so dependent on shipping manufacturing goods, components and final products. The process requires 24/7 connection to the status of the freight throughout the supply chain, and response to any changes that occur. The benefits of this type of system to the private sector shipper, and the fact that high-tech supply chain systems are gaining broader use and attention, are at the heart of the proposed SSTP demonstration.

**Innovation Showcase**

There is a considerable amount of activity within New York State and nationally in many of the areas mentioned in this section, with public and private sector programs, projects, and technologies being developed, tested, and applied. Section 3.2 of this report calls out a number of on-going and priority actions that could help move the corridor toward achieving its overall goals and the Smart elements. However, it is possible that this process may need a dedicated program and organization to ensure that these types of technologies and concepts are in fact developed. The concept of an Innovation Showcase can be a way of ensuring that Smart Corridor developments continue to occur and enable economic development along the I-87 Corridor. Both a program and an organization are required to address the following three

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objectives:

• help ensure that the corridor’s transportation system is as safe, efficient, and effective as possible;
• be a forum for information exchange and needs assessment so that the highest valued investigations can move forward; and
• showcase technologies that will enhance and advance the quality and quantity of transportation services provided in the corridor.

A roadmap for showcasing activities would define the requirements, value-added information technologies, and initial project concepts (including some of the proposed projects and concepts discussed in Section 3.2 and presented in more detail in Technical Memo #4: Smart Corridor Concepts) to achieve the Smart Corridor elements. The Showcase could implement the Smart Corridor vision on a programmatic basis and administer the day-to-day execution of the projects involved.

The specific projects selected for showcasing would come from a variety of sources that are appropriate to the development of the Smart Corridor. These sources would include vendors, government agencies, and universities and non-profit research institutions in all states, and other countries as well. The organization would acquire funding, solicit and manage projects, and coordinate all Smart Corridor and related economic development.

Furthermore, the showcasing organization would proactively explore new frontiers and promote the best results of innovation for the Smart Corridor on a long term strategic basis. While Figure 3-1 presented earlier was a rough snapshot of how technologies and transport market presently match up, Figure 3-2 provides a picture of what might be a comprehensive plan for showcase initiatives in these same technology-market pairs in the next 10 to 20 years. Figure 3-2 shows, for instance, that in the future, freight service coordination is likely to rely heavily on RFID technology, and that web access technologies are likely to be critical to the provision of tourism information systems.

The Innovation Showcase could investigate and evaluate powerful ITS applications using promising information technologies to create a network of Smart highways, drivers, freight, and public transportation. Information technologies that are clearly needed are those that can help the corridor strengthen its information backbone. This means that initially, the projects are expected to employ and deploy such technologies as Internet 2-class networking, satellite-based systems and wireless communications, mobile and pervasive computing (e.g., hand-held devices), chip-based Radio Frequency Identifier or Device, sensor networks, and real-time global data integration systems. Other possibilities include the monitoring of infrastructure conditions, emergency response and work zone management, personal trip support (user), 24/7 information integration for freight monitoring, tourist decision support, and data integration for Smart Freight and Homeland Security. Many of the proposed projects and concepts identified and developed in this Study fall into one or more of these categories.

By promoting innovative applications of emerging technologies to meet ITS requirements by users and the transportation infrastructure/systems, this effort would be fully consistent with NYSDOT’s on-going Transformation process. An Innovation Showcase could also help NYSDOT
### Figure 3-2
**Future Smart Systems Applications**

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**Degree of Coorelation:**
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and other Transportation Federation agencies support corridor communities in their on-going pursuit of improved mobility and greater economic development.