New Jersey Center for Automated Road Transportation Safety

(NJCARTS)

Center for Automated Truck Safety
(NJCATS)

Center for Automated Bus Safety
(NJCABS)

Center for Automated Car Safety
(NJCARS)

Prepared by

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Executive Summary

The mission of the Center for Automated Road Transportation Safety (NJCARTS) is to substantially improve safety on our existing conventional roadway infrastructure through the use of inexpensive automated collision avoidance systems installed on individual vehicles (trucks, buses and cars) operating harmoniously with conventional vehicles throughout most, if not all, of our existing roadways.

The Center is the synergistic co-location of activities focused on the Research, Development, Certification and Commercialization of inexpensive automated driving and collision avoidance technologies for vehicles operating on conventional public roads. In order to better address the needs of different modes NJCARTS consists of Modal Centers each focused on a mode: Center for Automated Truck Safety (NJCATS), Center for Automated Bus Safety (NJCABS), and Center for Automated Car Safety (NJCARS). The co-location of these Centers enables and encourages the shared use of workspace and engineering & testing facilities. Enabled is the cross fertilization of ideas and technologies in absence of collusion within a framework that ensures the protection of proprietary and intellectual property.

NJCARTS provides the overlay of facilities enabling each Modal Center to most effectively and efficiently advance the technologies in its particular mode. The organization is much like that of a University where the Modal Centers are the individual departments that utilize the facilities and cross-cutting resources made available by the overarching Consortium. Achieved is the strategic objective of accelerating the realization of improved safety on our conventional roads through the use of automated collision avoidance technologies.

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1. The Vision

1.1. Mission Statement
The mission of the New Jersey Center for Automated Road Transportation Safety (NJCARTS) is to substantially improve safety on our existing conventional roadway infrastructure through the use of inexpensive automated collision avoidance systems installed on individual vehicles operating harmoniously with conventional vehicles throughout most, if not all, existing roadways.

The scope of NJCARTS’s mission is across all modes that utilize the nation’s conventional road system: trucks, buses and cars.

1.2. Objectives and Goals
The achievement of the mission will be through the use of automated collision avoidance technologies that fundamentally go beyond crash mitigation, the principal conventional focus of highway safety, to crash avoidance. Moreover, it will focus on technologies that are vehicle-based requiring only that the neighboring vehicles operate conventionally according to conventional rules-of-the-road and human driving behaviors. This objective will enable fleet operators to substantially improve the safety of the drivers that they employ and for labor leaders to substantially improve the work environment experienced by their member drivers.

The objective will also be to focus on technologies that do not require any improvements to the existing roadway infrastructure that do not also substantiality benefit conventional vehicles.

It is expected that these objectives will lead to the development of inexpensive collision avoidance technologies that have an attractive RoI (Return on Investment) that will substantially accelerate the commercialization of these technologies and thus achieve the above mission.

1.3. Strategy
While many of the enabling technologies are being developed by established original equipment manufacturers (OEMs), these established companies tend to have adequate resources to be self-sufficient. Unfortunately, the same is not true for the after-market, new entrant, regulatory/public-oversight sectors, and the “fundamentally interested sectors” such as insurance and organized-labor. These entities are substantially resource-constrained in addressing this issue. Each of these sectors can benefit through co-location and the shared-use of facilities and expertise to substantially accelerate achievement of the safety objectives and goals. NJCARTS serves these sectors, with a core focus on the needs of truck, bus, and car fleet operators.

1.4. Execution
Achievement of the mission requires activity in four fundamental areas:

• Research that advances the state of the art in sensors, actuators, algorithms and data analysis focused on safety;
• Development that applies and tests the evolving technologies in appropriate settings;
• Certification that creates and evolves the testing environments and metrics that provide the appropriate public oversight that, indeed, these technologies will reduce collisions and enhance public benefit; and
• Commercialization that involves the development of appropriate analytical tools that accurately forecast the expected reduction in liability risk, the creation of a public show-place to properly demonstrate and
promote the technologies through each stage of their evolutionary process, and other activities that accelerate the adoption of the crash avoidance technologies.

These activities will enable the insurance sector to confidently quantify the advantages, and consequently promote the adoption, of these technologies. They will also enable organized labor to participate in the process that will ensure that the developed technologies will be appreciated, rather than incapacitated, by the drivers that these technologies are fundamentally intended to help.

Ultimately, the advantages of these technologies must be made abundantly clear to fleet-owners so that they will retrofit their existing fleets with the after-market technologies, specify these technologies when they acquire new vehicles from existing OEMs, and/or acquire new technologies from new entrants that serve new emerging markets (such as low-speed shared-ride vehicles in campuses and gated communities).

1.5. Tactics
To achieve the mission, NJCARTS will assemble and allocate assets, resources, and services that can allow members of NJCARTS to co-locate activities that contribute to the research, development, certification, and commercialization of automated collision avoidance systems for fleets of buses, trucks, and cars.

One potential location for the Center is the abandoned Fort Monmouth in Oceanside County, administered by the Fort Monmouth Economic Revitalization Authority (FMERA). In 2012 FMERA extended a verbal agreement to provide the following key assets to NJCARTS:

- The 25.8-acre McAfee complex of office;
- Several large garages; designed to accommodate military trucks and other hardware, they are outstanding for use as heavy-duty commercial truck and transit bus engineering garages;
- An 80 acre secure test area with a network of roadways for the initial testing and certification of emerging technologies; and
- A 2 square mile gated-access developing community served by conventional roadways that are an ideal “half-way house” for acceptance-testing of evolving technologies prior to launching them into the genuine real environment of the surrounding communities and the rest of region. See section 2.0 for a more detailed description.

Other potential locations have emerged to compete for CARTS’ presence.

NJCARTS will coordinate member activities focused on attracting both private- and public-sector financial resources to support its mission. It will focus marketing and solicitation activities that promote the broad public benefits that will be delivered by NJCARTS’s activities.

NJCARTS will develop professional services that can be shared among the various members such as patent, intellectual property, accounting, marketing, funding, commercialization, and other activities that will more efficiently enable each member to better succeed on its own as well as serve to better achieve the mission of NJCARTS.
Facilities: Fort Monmouth, New Jersey

Fort Monmouth is an ideal location for this activity. It is in the center of the largest market in the US. Within a 100 mile radius (Figure 2.1) live more than 28 million well-educated people that are served by more than 75% of the nation’s transit buses and whose goods are distributed by more truck miles than any other comparably sized area. Facilities-wise it has available office space, garage space, support space and is served by an advanced communications backbone that is ideal to support the needs of this technology. More importantly, it has an existing roadway network that is ideal to use as a base for creating ideal for development, testing and certification. A substantial portion of these roads can be cordoned for exclusive use. The remainder is part of a gated community in which sufficient precautions can be established that enable the developed technologies to gain operating experience in the presence of conventional vehicles prior to their release on public roadways. Extensive amenities already in place include recreational facilities, riverfront access and access to the New Jersey Shore, less than three miles (5 km) away and NJ Transit’s Little Silver rail station is less than a mile away. Finally, New Jersey has various tax incentives that will be available to encourage companies to join NJCARTS.

The repurposing of Fort Monmouth’s 1,126 acres of real estate, a former Army base, is governed thought the Fort Monmouth Economic Revitalization Authority (FMERA), an instrument of the New Jersey Economic Development Authority (NJ EDA). FMERA was created to provide investment, continuity and economic growth to the communities impacted by the federal government’s decision to close Fort Monmouth. FMERA’s Reuse and Redevelopment Plan for economic development, growth and planning has a focus on technology-based industries. In particular, FMERA created the Fort Monmouth Transportation Planning District in which the authority is charged with developing a multi-modal “comprehensive, future-oriented district transportation plan.” This plan can allow the operation of automated vehicles within the site under a variety of real-world conditions. The activities of NJCARTS directly serve the interests of this plan.
1.1. Available Facilities
The focal point of the CAV@FT activity will be in two exclusive areas, the 25.8-acre McAfee Campus (Figure 2.2) and an 80-acre secure testing area (Figure 3). The McAfee campus contains a 100,000 ft$^2$ of class A office building, the McAfee Office Building, (Figure 4), two large 1$^{st}$ class garage complexes that can each readily house several large trucks or buses and several smaller buildings that can accommodate specialized activities. The testing area is a fully enclosed and secure 80-acre parcel that contains many older buildings and a network of streets. These 80 acres will be augmented to create a closed testing and certification venue for collision avoidance vehicle technologies. Also available for advanced nearly-real-world-testing will be the remained of the nearly 2 mi$^2$ gated Fort Monmouth facility (Figure 5) containing numerous roads used by conventional vehicles on a daily basis.
Figure 2.3 80-acre Secure Test Site

Figure 2.4 100,000 ft² McAfee Office Building

Figure 5. Ft. Monmouth Main Post
3. Organizational Structure

In order to properly focus on the subtleties of individual modes, NJCARTS will be organized in a hierarchical structure with each mode having its own Center. As the names imply, the Center for Automated Truck Safety (NJCATS) focuses on the motor carrier industry, the Center for Automated Buses Safety (NJCATS) focuses on the transit industry, both public and private, and the Center for Automated Car Safety (NJCATS) focuses on the personal automobile industry. The overarching Center is responsible for the governance and overall management of all of the automated vehicle activities. It is responsible for the provision and allocation of shared facilities and resources; the interface with its neighbors at the Center, the surrounding communities, and state agencies; and for sourcing the supporting financial resources necessary to support the shared assets. Each of the centers is responsible for the management and support of its individual activities.

1.1. Legal structure

1.1.1. Independent, not-for-profit Corporation

Given that the mission of NJCARTS is to deliver public benefits in the form of greater safety through the coordinated action of its members, its preferred legal structure is as an independent, not-for-profit 501 (c)(6) Corporation. This structure will not only enable it to focus on making its members successful, but it allows for access to charitable donations and public funds, will facilitate its relations with FMERA, NJ EDA, Motor Vehicle Commission, Law and Public Safety, NJ Transit, and other regulatory and public transit agencies.

1.2. Governance

Governance of NJCARTS is according to a set of bylaws, see Appendix A, whose influence extends to each of the Centers.

1.1.1. Bylaws
See Appendix A

1.1.2. Governing Board

The Governing Board is composed of individuals duly elected from the realm of the various memberships to NJCARTS as described in the bylaws. During the first year of operation, the Governing Board will be composed of the representatives of the Trustees named in the incorporation document who will launch NJCARTS, finalize the bylaws, and refine the vision for NJCARTS. By the end of the first year the Trustees will oversee the establishment of the permanent Governing Board as per the adopted bylaws. Initial Trustees are in Appendix X.

The primary functions of the board are to establish policy guidelines for consortium operations and to assist in the recruiting and screening of consortium members. The board is instrumental in assembling the resources for the carrying out the vision of NJCARTS and for refining that vision as time evolves.

The Trustees will continue as an independent advisory resource of the Governing Board composed of the original Charter Members who wish to continue to serve as well as the invitation of other individuals as permitted by the bylaws.

1.1.3. Consortium Executive Director

It is the role of the full-time Consortium Executive Director to manage the overall operation of NJCARTS on a daily basis with the support of a small staff that initially is focused on recruiting and addressing the initial needs of NJCARTS members. Initially the staff will include one administrative assistant that will work closely with the executive director. Growth of the staff will be dictated by the needs of the Members.
1.1.4. Center Associate Directors
At some point, the separate modal approaches will become large enough such that separate Centers will be established to address the unique needs of the individual modes of Trucks, Buses, and Cars. Each of these sub-Centers will be headed by a Center Associate Director who will support the coordination activities among that sub-Center’s tenant and affiliate members.

1.3. Members
It is the intent of NJCARTS to make the Center’s services financially attractive to all Members; as such, facilities will be leased on an at-cost basis and subsidized by fund-raising activities. NJCARTS will also help coordinate the availability and receipt of public sector incentives such as tax credits and other public sector job creation incentives.

Three types of membership are envisioned: Charter, Tenant and Affiliate.

1.1.1. Charter Members.
Charter (Founding) Members are those initial organizations that come together to form NJCARTS. For taking on the risk and responsibility associated with start-up, Charter Members enjoy certain privileges that include a permanent, fee-free seat on the Independent Advisory Board. In lieu of a fee, they are of course permitted to make a tax-deductible charitable donation to NJCARTS to help defray its initial start-up costs.

1.1.2. Tenant Members
Tenant Members are those entities that choose to locate their activities at NJCARTS by leasing some of the office, engineering, and/or testing facilities available.

Tenant membership will be extended to all forms of entities including for-profit corporations, not-for-profit corporations, startups, public agencies, associations and Universities.

1.1.3. Affiliate Members
Affiliate members are those entities that choose to play an active role in NJCARTS without leasing space. Affiliate Members may play a role, as defined in the bylaws, in the governance of NJCARTS and in the sponsorship of activities. Affiliate Members also have priority in offering services and/or providing sub-contracting support to Tenant Members. Affiliate Membership requires the payment of an annual fee that is set by the governing board and may vary by organization type including private for-profit, independent non-profit, public-sector agency, and educational institution.

1.1.4. Ex-Officio Members
Ex-Officio Membership is reserved for public agencies that have an oversight responsibility and are likely to be impacted by the activities of NJCARTS. As ex-officio members they will be able to stay apprised of the activities of NJCARTS and thus better able to pursue their oversight responsibilities.

Draft 1.14 Business Plan
1.4. Organization/Reporting Chart
Figure 3.1 below depicts the relationship between the major organizational elements of NJCARTS

![Organization/Reporting Chart](image)

Figure 3.1 NJCARTS Organizational and Reporting Chart

4. Service Offerings

1.1. Office, engineering and garage space manager
This service offering will administer the lease of office, engineering and garage space among the Members.

1.2. Designer and operator of closed testing and certification facilities
This service is responsible for the proper design, construction, maintenance, and operation of the secured testing and certification facilities. This service will be carried out in collaboration with the members of NJCARTS under the direction of a standing subcommittee of the board of directors.

1.3. Coordinator of marketing and commercialization activities
This service is responsible for the promotion and marking of the activities of NJCARTS to support coordinated efforts in certification and commercialization. This service will be carried out in collaboration with the members of NJCARTS under the direction of a standing subcommittee of the board of directors.

1.4. Provision and coordination of joint-use professional services.
NJCARTS will assemble and coordinate professional services that that are more effectively and efficiently delivered on a shared basis such as intellectual property, accounting, packaging, computing, data, engineering, grant application, and other professional services. These services will be carried out in collaboration with the members of NJCARTS under the direction of a standing subcommittee of the board of directors.
5. Budget & Financials

1.1. Expenditures
Primary categories of expenditures for NJCARTS will be in the form of Rents, Renovations, Personnel, Professional Services, and Miscellaneous Overhead.

1.1.1. Rents
Rent expenditures for NJCARTS will be for the aggregate facilities used by NJCARTS and paid to the lessor. The Executive Director will negotiate these rents. Reimbursement for these rents will be sought from the Tenant members in proportion to their use of these assets.

1.1.2. Renovations
Occasionally facilities leased by NJCARTS whose use is intended to be shared among more than one of the tenants will be in need of renovations in order to properly serve its shared users. These improvements will be undertaken by NJCARTS. Expenses incurred will be recouped from the users of those facilities on a pro rata basis. Improvements to sole-user spaces and facilities will be entirely the responsibility of the sole-user tenant.

1.1.3. Personnel
Initially, personnel will include only a full-time Executive Director and full-time Administrative Assistant. Depending on how fast the activities ramp up it is foreseen that initially two people may be added to create a Marketing and Promotion activity and a fifth person added in Facility Improvement to enhance the private testing facility and begin to create a dedicated certification facility. The next phase of personnel expansion is expected to be the addition of personnel to create the modally-oriented Centers to include Center Assistant Directors and a skeleton support staff. For budgeting purposes, salaries will be $150k for the executive Director and a blended $100k for the support staff. Employee benefits, overhead and taxes will be budgeted at 80% of salary.

For budgetary purposes for the first year it is estimated that personnel will include a full year of the Executive Director, an assistant for the full year and three additional people for a half-year.

1.1.4. Professional Services
This expenditure includes primarily the use of legal and accounting services in support of NJCARTS activities. Professional services are estimated to be 10% of direct personnel expenses.

1.1.5. Miscellaneous Overhead
Miscellaneous overhead includes expenses for supplies, printing, communications, travel, and other fees in support of the activities of NJCARTS. For budgetary purposes these will be initially estimated to be 20% of direct personnel salaries.

1.2. Revenue/Funding Sources
Sources of revenue will include rents paid by Tenant Members, membership fees paid by Affiliated Members, contributions made by all forms of Membership, and grants made by public agencies and non-profit corporations.
1.1.1. Rents
Rents will be assessed to Tenant members in proportion to their use of NJCARTS facilities. It is intended that these rent revenues perfectly offset NJCARTS’s rent expenditures. Additional assessments will be made to the Tenant members to offset renovation expenses for shared spaces. Renovations of single-user spaces will entirely be the responsibility of the single user.

1.1.2. Membership Fees
Affiliate Members will be assessed a membership fee. The fees will be set by the board of directors and are intended primarily to support operating costs. Fees may vary for different types of entities, with for-profit corporations likely assessed the largest fee and public agencies and Universities the lowest fees.

1.1.3. Contributions
In order to more quickly establish NJCARTS, a Membership fee will not be assessed to Charter Members nor Tenant Members; however, each of these members will be solicited to make a voluntary contribution to support the overhead activities of NJCARTS. These solicitations will be primarily the responsibility of the Executive Director.

1.1.4. Grants
Public agencies, associations, and philanthropic organizations will be solicited for grants to support the creation and growth of NJCARTS. It is a primary responsibility of the Executive Director and the Marketing/Promotion staff to solicit these grants and respond to request-for-proposals.
1.3. First Year Budget

Table 5.1 contains the first year budget estimates

### Expenditures (x $1,000)

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### Revenue (x $1,000)

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| Net | $8 |

Table 5.1 1st year Budget estimates
6. Evolutionary Plan

1.1. The Beginning

1.2. Plans for the 1st Year

7. Next Steps

1.1. NJCARTS

Appendix

A.1 Bylaws (see attached document)