State of Florida
Department of Transportation
Central Procurement Office
605 Suwannee Street
Tallahassee, Florida 32399-0450

INVITATION TO NEGOTIATE (ITN) REGISTRATION

****
COMPLETE AND RETURN THIS FORM
TO THE ABOVE ADDRESS OR FAX TO 850/922-3019
****

Negotiation Number: ITN-DOT-02/03-9025-RR

Title: Statewide Transportation Management Center Software Library System

Deadline for submission of Forms: 2:30 P.M. local time, November 15, 2002.

Potential participants should notify our office by returning this ITN Registration Form as soon as possible after downloading. Complete the information below and fax this sheet only to the Florida Department of Transportation Procurement Office at 850/922-3019, or mail to the address noted above.

THE INVITATION TO NEGOTIATE DOCUMENT YOU RECEIVED IS SUBJECT TO CHANGE. Notice of changes (addenda), will be posted on the Florida Vendor Bid System at www.myflorida.com, under this negotiation number (click on Business & Industry, scroll down to "Doing Business with the State...", click on "State Purchasing", click on "Everything for Vendors and Customers", go down to "Vendor Bid System (VBS)", click on Search Advertisements, click on the drop-down arrow beside the box under Agency, select DEPARTMENT OF TRANSPORTATION, then go to the bottom of the same page and click on Initiate Search). It is the responsibility of all potential proposers to monitor this site for any changing information prior to submitting your response.

Company Name: _____

Contact Person: _____

Address: _____

City, State, Zip: _____

Telephone: (   ) _____   Fax Number : (   ) _____

Internet E-Mail Address: _____

Signed: _____   Date: _____

For further information on this process, you may contact Renee Randall at (850) 414-4481.

SUBMIT TO:	STATE OF FLORIDA **INVITATION TO NEGOTIATE** ACKNOWLEDGMENT

Page 1 of *pages*	NEGOTIATIONS WILL BE HELD and may not be withdrawn within ____ days after such date and time.	NEGOTIATION NO.

AGENCY MAILING DATE: **TITLE:**

STATE PURCHASING SUBSYSTEM (SPURS) VENDOR NUMBER

VENDOR NAME	REASON FOR NO RESPONSE
VENDOR MAILING ADDRESS	
CITY - STATE - ZIP	**POSTING OF NEGOTIATION TABULATIONS** Bid tabulations with recommended awards will be posted for review by interested parties at the location where bids were opened and will remain posted for a period of 72 hours. Failure to file a protest within the time prescribed in Section 120.57(3), or failure to post the bond or other security required by law within the time allowed for filing a bond shall constitute a waiver of proceedings under Chapter 120, Florida Statutes. Posting will be on or about:

AREA CODE	PHONE NUMBER
	FREE NUMBER

I certify that this negotiation is made without prior understanding, agreement, or connection with any corporation, firm, or person submitting an offer for the same material, supplies ,equipment or services, and is in all respects fair and without collusion or fraud. I agree to abide by all conditions of this negotiation and certify that I am authorized to sign this response and that the offer is in compliance with all requirements of the Invitation to Negotiate, including but not limited to, certification requirements. In conducting negotiations with an agency for the State of Florida, respondent offers and agrees that if this negotiation is accepted, the respondent will convey, sell, assign or transfer to the State of Florida all rights, title and interest in and to all causes of action it may now or hereafter acquire under the Anti-trust laws of the United States and the State of Florida for price fixing relating to the particular commodities or services purchased or acquired by the State of Florida. At the State's discretion, such assignment shall be made and become effective at the time the purchasing agency tenders final payment to the respondent.

AUTHORIZED SIGNATURE (MANUAL)

AUTHORIZED SIGNATURE (TYPED) TITLE

GENERAL CONDITIONS

1. NEGOTIATION: Negotiation must contain a manual signature of authorized representative in the space provided above. Negotiation must be typed or printed in ink. Use of erasable ink is not permitted. All corrections made to price must be initialed. The company name and SPURS vendor number shall appear on each page as required. (NOTE: if you are registered with DMS, your SPURS vendor number is located just above your firm's name on the label of the envelope transmitting this invitation .) Complete ordering instructions must be submitted with the negotiation. If you are not a registered vendor with the Department of Management Services, contact State Purchasing, 4050 Esplanade Way, Suite 360, Tallahassee, FL. 32399-0950, (850) 487-4634 immediately.

2. NO RESPONSE: If not submitting a negotiation package, respond by returning only this Invitation to Negotiate acknowledgement form, marking it "NO RESPONSE" and explain the reason in the space provided above. Failure to respond to a procurement solicitation without giving justifiable reason for such failure, non-conformance to contract conditions, or other pertinent factors deemed reasonable and valid shall be cause for removal of the supplier's name from the mailing list. NOTE: To qualify as a respondent, respondent must submit a "NO RESPONSE", and it must be received no later than the stated opening date and hour.

3. PRICES, TERMS AND PAYMENT: Firm prices shall be quoted and include all packing,handling shipping charges and delivery to any point within the State of Florida.

a) TAXES: The State of Florida does not pay Federal Excise and Sales taxes on direct purchases of tangible personal property. See tax exemption number on face of purchase order. This exemption does not apply to purchases of tangible personal property made by contractors who use the tangible personal property in the performance of contracts for the improvement of state owned real property as defined in Chapter 192, F.S.

b) CASH DISCOUNTS: Cash discounts for prompt payment shall not be considered in determining the lowest net cost for evaluation purposes.

c) MISTAKES: Respondents are expected to examine the specifications, delivery schedule, negotiated prices, and all instructions pertaining to supplies and services. Failure to do so will be at respondent's risk. In case of mistake in extension the unit price will govern.

d) CONDITION AND PACKAGING: It is understood and agreed that any item offered or shipped as a result of this negotiation shall be new (current model available at the time of this negotiation). All containers shall be suitable for storage or shipment, and all prices shall include standard commercial packaging.

e) SAFETY STANDARDS: Unless otherwise stipulated in the negotiation, all manufactured items and fabricated assemblies shall comply with applicable requirements of Occupational Safety and Health Act and any standards thereunder.

f) INVOICING AND PAYMENT: The contractor shall be paid upon submission of properly certified invoice to the purchaser at the prices stipulated on the contract at the time the order is placed, after delivery and acceptance of good or services, less deductions if any, as provided. Invoices shall contain the contract number, purchase order number and the contractor's SPURS vendor number. An original and three (3) copies of the invoice shall be submitted. Failure to follow these instructions may result in delay in processing invoices for payment.

INTEREST PENALTIES: Payment shall be made in accordance with Section 215.422, F.S., which states the contractor's rights and the State agency's responsibilities concerning interest penalties and time limits for payment of invoices. **VENDOR RESPONSE SYSTEM:** To access an interactive Voice Response System for vendor payment inquiry, vendors may call (850) 413-7269 between 7 a.m. and 6 p.m. Monday through Friday to check on the status of payments by State agencies. The system can accommodate English and Spanish speaking callers. **VENDOR OMBUDSMAN:** Vendors providing goods and services to an agency should be aware of the following time frames. Upon receipt an agency has five (5) working days to inspect and approve the goods and services, unless the response specifications, purchase order or contract specifies otherwise. An agency has 20 days to deliver a request for payment (voucher) to the Department of Banking and Finance. The 20 days are measured from the latter of the date the invoice is received or the goods and services are received, inspected and approved. If a payment is not available within 40 days, a separate interest penalty set by the Comptroller pursuant to Section 55.03 F.S. , will be due and payable , in addition to the invoice amount to the vendor. To obtain the applicable interest rate, contact the agency purchasing office. The interest penalty provision applies after a 35 day time period to health care providers, as defined by rule. Interest penalties of less than one (1) dollar will not be enforced unless the vendor requests payment. Invoices which have to be returned to a vendor because of vendor preparation errors will result in a delay in the payment. The invoice payment requirements do not start until a properly completed invoice is provided to the agency. A Vendor Ombudsman has been established within the Department of Banking and Finance. The duties of this individual include acting as an advocate of vendors who may be experiencing problems in obtaining timely payment(s) from a State agency. The Vendor Ombudsman may be contacted at (850) 488-2924 or by calling the State Comptroller's Hotline, 1-800-848-3792. State Purchasing shall review the conditions and circumstances surrounding non-payment, and unless there is a bona fide dispute, State Purchasing may, in writing, authorize the contract supplier to reject and return purchase orders from said agency until such time as the agency complies with the provisions of Section 215.422, F.S.

g) ANNUAL APPROPRIATIONS: The State of Florida's performance and obligation to pay under this contract is contingent upon an annual appropriation by the Legislature.

4. MANUFACTURERS' NAME AND APPROVED EQUIVALENTS: Any manufacturers names, trade names, brand names, information and/or catalog numbers listed in a specification are for information and not intended to limit competition. The respondent may offer any brand for which he is an authorized representative, which meets or exceeds the specifications for any item(s). **Measurements:** Customary measurements appearing in these specifications are not intended to preclude responses for commodities with metric measurements. If responses are based on equivalent products, indicate on the response form the manufacture's name and number. Respondent shall submit with his response, cuts, sketches, and descriptive literature, and/or complete specifications. Reference to literature submitted with a previous response will not satisfy this provision. The State of Florida reserves the right to determine acceptance of item(s) as an approved equivalent. Responses which do not comply with these requirements are subject to rejection. Responses lacking any written indication of intent to respond with an alternate brand will be received and considered in complete compliance with the specifications as listed on the response form. State Purchasing is to be notified of any proposed changes in (a) materials used, (b) manufacturing process, or (c) construction. However, changes shall not be binding upon the State unless evidenced by Change Notice issued and signed by the Agency Purchasing Director, or Purchasing Agent.

5. **INTERPRETATIONS/DISPUTES:** Any questions concerning conditions and specifications shall be directed in writing to this office for receipt no later than ten (10)days prior to the negotiation opening. Inquiries must reference the date of negotiation and negotiation number. No interpretation shall be considered binding unless provided in writing by the State of Florida in response to requests in full compliance with this provision. Any person who is adversely affected by an Agency decision or intended decision concerning a procurement solicitation or contract award and who wants to protest such decision or intended decision shall file a protest in compliance with Chapter 28-110, Florida Adminstrative Code. Failure to file a protest within the time prescribed in Section 120.57(3), F.S. or failure to post the bond or other security required by law within the time allowed for filing a bond shall constitute a waiver of proceedings under Chapter 120 F.S.

6. **NOTICE OF NEGOTIATION PROTEST BONDING REQUIREMENT:** Any person who files an action protesting a decision or intended decision pertaining to contracts administered by State Purchasing or State agency pursuant to Section 120.57 (3), F.S., shall post with State Purchasing or the State agency at the time of filing the formal written protest, or within the 10 day period allowed for filing the formal written protest, a bond payable to State Purchasing or the State agency in an amount equal to 1 percent of the estimated total volume of the contract or $5000, whichever is less, which bond shall be conditioned upon the payment of all costs which may be adjudged against him in the administrative hearing in which the action is brought and in any subsequent appellate court proceeding. For protest of decisions or intended decisions of State Purchasing pertaining to agencies' requests for approval of exceptional purchases, the bond shall be in the amount equal to 1 percent of the requesting agency's estimate of the contract amount for the exceptional purchase requested or $5000, whichever is less. In lieu of a bond, State Purchasing or the State agency may, in either case, accept a cashier's check or money order in the amount of the bond. **FAILURE TO FILE THE PROPER BOND AT THE REQUIRED TIME WILL RESULT IN A DENIAL OF THE PROTEST.**

7. **CONFLICT OF INTEREST:** The award hereunder is subject to the provisions of Chapter 112, F.S. All respondents must disclose with their response the name of any officer, director, or agent who is also an employee of the State of Florida , or any of its agencies. Further, all respondents must disclose name of any State employee who owns, directly or indirectly, an interest of five percent (5%) or more in the respondent's firm or any of its branches.

8. **AWARDS:** As the best interest of the State may require, the right is reserved to make award(s) by individual item, group of items, all or none, or a combination thereof; on a geographical district basis and/or on a statewide basis with one or more suppliers; to reject any and all negotiations, waive any minor irregularity or technicality in any response received. When it is determined there is competition to the lowest responsible respondent, evaluation of other responses are not required. Respondents are cautioned to make no assumptions, unless their response has been evaluated as being responsive. All awards made as a result of this negotiation shall conform to applicable Florida Statutes.

9. **NONCONFORMANCE TO CONTRACT CONDITIONS:** Items may be tested for compliance with specifications by the Florida Department of Agriculture and Consumer Services, or by others acceptable to the State. Should the items fail testing, the State may require the vendor to reimburse the State for costs incurred by the State in connection with the examination or testing of the commodity including costs relating to transporting the commodity samples to the testing site, actual test costs, personnel costs, and other applicable costs. The data derived from any tests for compliance with specifications are public records and open to examination thereto in accordance with Chapter 119, F.S. Items delivered not conforming to specifications may be rejected and returned at vendor's expense. These items and items not delivered as per delivery date in negotiation and/or purchase order may result in contractor being found in default in which event any and all reprocurement costs may be charged against the defaulting contractor. Any violation of these stipulations may also result in:
a) Supplier's name being removed from State Purchasing vendor mailing list.
b) All State departments being advised not to do business with the supplier without written approval from State Purchasing until such time as supplier reimburses the State for all reprocurement and cover costs.

10. **INSPECTION, ACCEPTANCE AND TITLE:** Inspection and acceptance will be at destination unless otherwise provided. Title and risk of loss or damage to all items shall be the responsibility of the contract supplier until accepted by the ordering agency, unless loss or damage results from negligence by the ordering agency. The contract supplier shall be responsible for filing, processing and collecting all damage claims. However, to assist him in the expeditious handing of damage claims, the ordering agency will:
a) Record any evidence of visible damage on all copies of the delivering carrier's Bill of Lading.
b) Report damage (Visible and Concealed) to the carrier and contract supplier, confirming such reports, in writing within 15 days of delivery, requesting that the carrier inspect the damaged merchandise.
c) Provide the contract supplier with a copy of the carrier's Bill of Lading and damage inspection report.

11. **GOVERNMENTAL RESTRICTIONS:** In the event any governmental restrictions may be imposed which would necessitate alteration of the material, quality, workmanship or performance of the items offered in this response prior to their delivery, it shall be the responsibility of the supplier to notify the State at once, indicating in a letter the specific regulation which required an alteration. The State reserves the right to accept any such alteration, including any price adjustments occasioned thereby, or to cancel the contract at no further expense to the State.

12. **LEGAL REQUIREMENTS**: Applicable provisions of all Federal , State, County and local laws, and all ordinances, rules, and regulations shall govern development, submittal and evaluation of all responses received in response hereto and shall govern any and all claims and disputes which may arise between person(s) submitting a response hereto and the State of Florida, by and through its officers, employees and authorized representatives, or any other person, natural or otherwise; and lack of knowledge by any respondent shall not constitute a cognizable defense against the legal effect thereof.

13. **PATENTS AND ROYALTIES:** The respondent, without exception, shall indemnify and save harmless the purchaser and its employees from liability of any nature or kind, including cost and expenses for or on account of any copyrighted, patented, or unpatented invention, process or article supplied by the contractor. The contractor has no liability when such claim is solely and exclusively due to the combination, operation or use of any article supplied hereunder with equipment or data not supplied by contractor or is based solely and exclusively upon the State's alteration of the article. The purchaser will provide prompt written notification of a claim of copyright or patent infringement and will afford the contractor full opportunity to defend the action and control the defense. Further, if such a claim is made or is pending the contractor may, at its options and expenses procure for the purchaser the right to continue use of, replace or modify the article to render it noninfringing. (If none of the alternatives are reasonably available, the State agrees to return the article on request to the contractor and receive reimbursement, if any, as may be determined by a court of competent jurisdiction.) If the contractor uses any design, device, or materials covered by letters, patent or copyright, it is mutually agreed and understood without exception that the negotiated prices shall include all royalties or costs arising from the use of such design, device, or materials in any way involved in the work.

14. **PRICE ADJUSTMENTS:** Any price decrease effectuated during the contract period by reason of market change shall be passed on to the State of Florida. This shall also apply to all in-place equipment on rent or lease plan. Price increases are not acceptable.

15. **CANCELLATION:** All contract obligations shall prevail for at least one hundred eighty (180) days after effective date of the contract. Also, cancellation may be required in accordance with Section 287.042(2)(b) and (c), F.S. In addition to the provisions of the Renewal Paragraph, for the protection of both parties, this contract may be cancelled in whole or in part by either party by giving thirty (30) days prior notice in writing to the other party.

16. **RENEWAL:** The Purchaser reserves the option to renew the period of this contract or any portion thereof, for an additional term not to exceed the original contract period unless the original contract period is 24 months or less in which case the contract may be renewed up to 2 one year periods. Renewal of the contract period shall be by mutual agreement in writing.

17. **ADVERTISING:** In submitting a response, respondent agrees not to use the results therefrom as part of any commercial advertising.

18. **ASSIGNMENT:** Any Purchase Order issued pursuant to this negotiation and the monies which may become due hereunder are not assignable except with the prior written approval of the ordering agency. State Purchasing or State agency may assign the resulting contract upon mutual consent.

19. **LIABILITY:** The supplier shall hold and save the State of Florida, its officers, agents, and employees harmless against claims by third parties resulting from the supplier's breach of this contract or the supplier's negligence.

20. **FACILITIES:** The State reserves the right to inspect the respondent's facilities at any reasonable time with prior notice.

21. **THE SUCCESSFUL RESPONDENT(S) MUST PROVIDE:** A copy of any product literature and price list, in excellent quality black image on white paper.

22. **ADDITION/DELETION OF ITEMS:** The State of Florida reserves the right to add to or delete any item from this negotiation or resulting contract when deemed to be in the State's best interest.

23. **ORDERING INSTRUCTIONS:** Manufacturers are encouraged to negotiate direct naming dealers who will accept orders and complete deliveries. Respondent must include complete detailed ordering instructions, including SPURS vendor number(s) for invoicing dealers on the negotiation form provided.

24. **PUBLIC PRINTING:** A respondent must have at the time of negotiation a manufacturing plant in operation which is capable of producing the items negotiated and so certify upon request of the agency . Every agency of the State, including agencies within the legislative and judicial branches of government, shall give preference to respondents located within the State when awarding contracts to have materials printed, whenever such printing can be done at no greater expense than, and at a level of quality comparable to that obtainable from a respondent located outside the State.

25. **PUBLIC RECORDS:** Any material submitted in response to this Invitation to Negotiate will become a public document pursuant to Section 119.07, F.S. This includes material which the responding proposer might consider to be confidential or a trade secret. Any claim of confidentiality is waived upon submission, effective after opening pursuant to Section 119.07, F.S.

NOTE:

ANY AND ALL SPECIAL CONDITIONS AND SPECIFICATIONS ATTACHED HERETO WHICH VARY FROM THESE GENERAL CONDITIONS SHALL HAVE PRECEDENCE. THIS SHEET AND THE ACCOMPANYING NEGOTIATION DOCUMENTS CONSTITUTE AN OFFER FROM THE RESPONDENT. IF ANY OR ALL PARTS OF THE NEGOTIATION ARE ACCEPTED BY THE AGENCY REPRESENTATIVE AN AUTHORIZED REPRESENTATIVE OF STATE PURCHASING OF THE DEPARTMENT OF MANAGEMENT SERVICES SHALL AFFIX HIS SIGNATURE HERETO, AND THIS SHALL THEN CONSTITUTE THE WRITTEN AGREEMENT BETWEEN PARTIES. THE CONDITIONS OF THIS FORM BECOME A PART OF THE WRITTEN AGREEMENT BETWEEN THE PARTIES.

STATE OF FLORIDA

BY: _____   CONTRACT NUMBER _____
           AUTHORIZED AGENCY SIGNATURE

DATE:_____   EFFECTIVE _____ THROUGH _____

QUALIFICATIONS QUESTIONNAIRE

INVITATION TO NEGOTIATE #: ITN-DOT-02/03-9025-RR

TITLE: Statewide Transportation Management Center Software Library System

PROPOSER (Firm):   **FAX #:**

SUBMITTED BY (Authorized Person):
(Name and Title Printed)

SIGNATURE: **DATE:**
(Signature)

The Proposers must attach these two pages of Qualifications Questionnaire Form as coversheets and provide complete and responsive answers to the following questions on separate sheets (in Adobe Portable Document Format, Version 5.0 or later). By completing the above information with signature and date, the Proposers will assume full responsibility of all answers.

1. Has your firm been a developer or integrator of transportation management center (TMC) software systems of the level and complexity described in Exhibit "A", Scope of Services, and Exhibit "B", Requirements Specification, for a period of no less than five (5) years? If yes, how long has your firm provided these services and what types of services do you provide? If yes, please provide, as an attachment to this questionnaire, a list of these TMC software work references including each client's name, contact person, address, and phone number.

2. Based on Exhibit "A", Scope of Services, and Exhibit "B", Requirements Specification, how many months do you estimate it will take for your firm to develop and deploy this software at the pilot deployment site?

3. What is your firm's approach to providing the Department with the non-proprietarily public-owned source code and a complete set of associated documentation for Statewide Transportation Management Center Software Library System (STMCSLS)?

4. What software languages and operating systems does your firm have expertise in?

5. What capabilities and experience does your firm possess to satisfactorily perform all the tasks specified in Exhibit "A", Scope of Services?

6. What are the names and qualifications for the project manager, key designers, and software developers, who would perform the work on this contract? Provide a summary of the qualifications and brief resumes (one page or less) of key personnel involved in the project.

7. What is the project manager's experience managing transportation management center software projects and experience with intelligent transportation systems (ITS)?

8. Please provide a proposed staffing chart and management plan for the project. The management plan must include the names of all key personnel, their locations and roles in the project, and their availability.

9. Please describe the TMC software development environment and facilities your firm uses to develop and manage software.

10. Are personnel within your firm experienced in working with and developing Oracle databases? If yes, do they use the Oracle Designer (6i or 9i) 2000 CASE tool? If not, what do they use?

11. Are personnel within your firm experienced in the use of Rational Software products, specifically Requisite Pro and Clear Case? If yes, please explain your level of expertise with the products. If no, please explain what other software tools your firm uses to track requirements and develop software.

12. Are personnel within your firm experienced in the use of GIS products? Are they experienced in the use of ESRI's ARCView and ARCInfo? Please provide a list of GIS products that your firm has integrated with on recent projects.

13. Are personnel within your firm experienced in the integration of ITS field device driver softwares into an ATMS software system such as dynamic message sign control, surveillance camera pan-tilt-zoom control, video wall display and control?

14. Does your firm have a formal, documented process for configuration management of your products? If yes, please provide it in your response (may be a separate attachment).

15. Does your firm have a formal, documented software development process? If yes, please provide it in your response (may be a separate attachment).

16. Does your firm have a formal, documented software quality assurance program? If yes, please provide it in your response (may be a separate attachment).

17. Does your firm have a formal, documented software security plan and network security plan? If yes, please provide proof an existing application of the security plan.

18. The Software Engineering Institute (SEI) Capability Maturity Model (CMM) is a framework that describes the elements of an effective software process. What CMM level has your firm attained (Level-1 to level-5)?

19. What will be your firm's software test concept including design verification test (DVT) at the vendor's site? How will you test the software before the final acceptance testing? How will your software be tested in the Department designated site?

20. Where will your firm's software development update and maintenance site(s) be located?

21. What is your plan to include the participation of disadvantaged business enterprise (DBE) on this contract?

22. Is your firm able to provide proof of professional liability insurance and a performance bond that are identified in the "Special Conditions" with minimum coverage of one million dollars ($1,000,000) of each?

DBE PARTICIPATION STATEMENT

Note: The Consultant is required to complete the following information and submit this form with the technical proposal.

Project Description:_____

Consultant Name:_____

This consultant (is____) (is not____) a Department of Transportation certified Disadvantaged Business Enterprise (DBE).

Expected percentage of contract fees to be subcontracted to DBE(s): _____ %

If the intention is to subcontract a portion of the contract fees to DBE(s), the proposed DBE sub-consultants are as follows:

DBE Sub-Consultant   Type of Work/Commodity

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

By: _____
Title: _____
Date: _____

BID OPPORTUNITY LIST

Please complete and mail, fax or e-mail to Equal Opportunity Office

605 Suwannee St., MS 65
Tallahassee, FL 32399-0450
TELEPHONE: (850) 414-4747
FAX: (850) 488-3914
Valeria.Robinson@dot.state.fl.us

This information may also be included in your bid or proposal package.

Prime Contractor/Consultant: _____

Address/Telephone Number: _____

Quotes/Received During Month/Yr: _____

49 CFR Part 26.11 requires the Florida Department of Transportation to develop and maintain a "bid opportunity list." The list is intended to be a listing of all firms that are participating, or attempting to participate, on DOT-assisted contracts. The list must include all firms that bid on prime contracts or bid or quote subcontracts and material supplies on DOT-assisted projects, including both DBEs and non-DBEs. For consulting companies this list must include all subconsultants contacting you and expressing an interest in teaming with you on a specific DOT assisted project. Prime contractors and consultants must provide information for No. 1 and should provide any information they have available on Numbers 2, 3, 4 and 5 for themselves, subcontractors and subconsultants.

1. Firm Name/Address/Phone: Receipts:

_____
than $1 Million

_____
$1-$5 Million

_____
$5-$10 Million

_____
$10-$15 Million

_____
than$15 Million
2. Age of Firm: _____

3.
☐ **DBE**
☐ **Non-DBE**
☐

4.

☐
Sub-contractor ☐
Sub-consultant

5. Annual Gross
☐ **Less**
☐ **Between**
☐ **Between**
☐ **Between**
☐ **More**

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1. Firm Name/Address/Phone: Receipts:

_____
than $1 Million

_____
$1-$5 Million

_____
$5-$10 Million

_____
$10-$15 Million

_____
than$15 Million
2. Age of Firm: _____

3.
☐
☐ **DBE**
☐ **Non-DBE**
☐

4.

☐
Sub-contractor ☐
Sub-consultant

5. Annual Gross
☐ **Less**
☐ **Between**
☐ **Between**
☐ **Between**
☐ **More**

1. Firm Name/Address/Phone:
Receipts:

_____
than $1 Million

_____
$1-$5 Million

_____
$5-$10 Million

_____
$10-$15 Million

_____
than$15 Million

2. Age of Firm: _____

3. ☐☐

☐☐

4.

5. Annual Gross

DBE ☐ Less

Non-DBE ☐ Between

☐ Between

☐ Between

Sub-contractor ☐ More

Sub-consultant

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1. Firm Name/Address/Phone:
Receipts:

_____
than $1 Million

_____
$1-$5 Million

_____
$5-$10 Million

_____
$10-$15 Million

_____
than$15 Million

2. Age of Firm: _____

3. ☐☐

☐☐

4

5. Annual Gross

DBE ☐ Less

Non-DBE ☐ Between
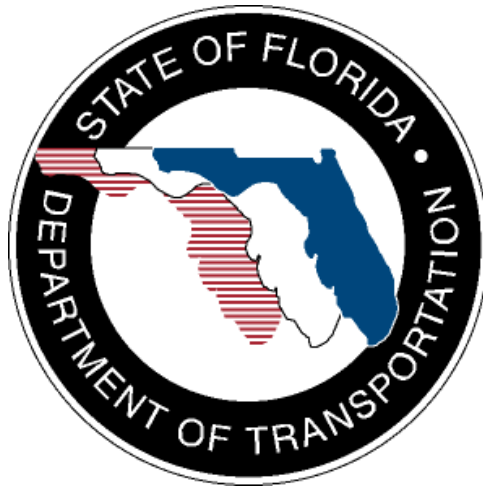
☐ Between

☐ Between

Sub-contractor ☐ More

Sub-consultant

State of Florida
Department of Transportation

INVITATION TO NEGOTIATE

STATEWIDE TRANSPORTATION MANAGEMENT CENTER SOFTWARE LIBRARY SYSTEM

ITN-DOT-02/03-9025-RR

MAIL OR DELIVER ALL REPLIES EXCEPT THE BID OPPORTUNITY LIST FORM TO:

Florida Department of Transportation
Central Procurement Office
605 Suwannee Street, M.S. 20
Tallahassee, Florida 32399-0450
Official Contact Person: Renee Randall
Phone: (850) 414-4481
Fax: (850) 922-3019
Email: renee.randall@dot.state.fl.us

SPECIAL CONDITIONS

1. **INVITATION TO NEGOTIATE (ITN-DOT-02/03-9025-RR)**

    The State of Florida Department of Transportation (hereinafter referred to as the "Department") is soliciting technical and price proposals from short-listed Proposers interested in participating in competitive negotiations to establish a term contract to provide a <u>Statewide Transportation Management Center Software Library System (STMCSLS)</u>. It is anticipated that the initial term of the agreement will be from the date of contract execution through <u>five (5) years</u>.

    The Department intends to execute a contract with the responsive and responsible Proposer whose proposal is determined by the Evaluation and Selection Committee(s) to be the most advantageous to the Department. After the contract has been executed, said Proposer will be referred to as the "Vendor".

2. **CONTRACT RENEWAL**

    This contract may be renewed on a yearly basis for a period of up to three years after the initial contract or for a period no longer than the original contract, whichever period is longer. Renewals shall be contingent upon satisfactory performance evaluations by the Department and subject to the availability of funds. Renewal of the contract shall be by mutual agreement in writing and shall be subject to the same terms and conditions set forth in the initial contract.

3. **SCOPE OF SERVICES/SPECIFICATIONS**

    Details of the desired commodities/services and information and items to be furnished by the Contract Vendor are described in Exhibit "A", Scope of Services, and in Exhibit "B", Requirements Specification, attached hereto and made a part hereof.

4. **INVITATION TO NEGOTIATE QUESTIONS AND ANSWERS**

    Any questions (contract, administrative or technical) arising from this ITN must be forwarded, in writing, to the procurement agent identified below. In order for technical questions to be answered in a timely fashion, **technical questions must be received no later than 2:30 P.M. local time on November 1, 2002.** There is no deadline for contract or administrative questions.

    The Department's written responses to written questions submitted in a timely manner by interested Proposers will be posted on the Florida Vendor Bid System at <u>www.myflorida.com</u> under this negotiation number. [click on "BUSINESS", click on "Doing Business with the State", under "Everything for Vendors and Customers", click on "Vendor Bid System (VBS)", then click on "Search Advertisements"] It is the responsibility of all interested Proposers to monitor this site for any changing information prior to submitting their responses.

    <u>Only written questions from interested Proposers, which are signed by persons authorized to contractually bind the Proposers, will be recognized by the Department as duly authorized expressions on behalf of the Proposers</u>.

WRITTEN QUESTIONS must be submitted to:

Florida Department of Transportation
Central Procurement Office
605 Suwannee Street, M.S. 20
Tallahassee, Florida 32399-0450
Official Contact Person: Renee Randall
Phone: (850) 414-4481
Fax: (850) 922-3019
Email: renee.randall@dot.state.fl.us

5.   **RESERVATIONS**

The Department reserves the right to reject any and all Responses received pursuant to this Invitation to Negotiate, if the Department determines such action is in the best interest of the Department. The Department reserves the right to waive minor irregularities in submitted Responses.

6.   **SUBMISSION OF SEALED REPLY: (DO NOT FAX)**

Replies must be submitted in a sealed envelope/package that should be labeled with the Negotiation number and the opening date and time. Sealed replies will be received until 2:30 P.M. local time, November 15, 2002. **Replies received after that time and date will not be considered.**

7.   **OPENING OF SEALED REPLIES**

The sealed replies will be opened by the Department's Procurement Office personnel at Haydon Burns Building, 605 Suwannee Street, Room 481, Tallahassee, Florida 32399-0450, on November 15, 2002 at 2:30 P.M. local time. All reply openings are open to the public.

8.   **NEGOTIATION PROCESS**

The Department reserves the right to negotiate concurrently, or in series, with competing Proposers, as set out below. The participating Proposers should be cognizant of the fact that the Department reserves the right to finalize the negotiation process at any time if the Department determines such action would be in the best interest of the State. Responses should include a straightforward, concise description of the Proposers' ability to meet the requirements to allow the Department to properly evaluate the Proposers' responses.

Step 1   Proposers must submit the following forms to the Department:
   (1) State of Florida Invitation to Negotiate Acknowledgement Form;
   (2) Qualifications Questionnaire Form;
   (3) DBE Participation Statement Form (if applicable); and
   (4) Bid Opportunity List Form (if applicable).

Step 2

   2.1. The Technical Evaluation Committee will evaluate the responses received from **Step 1** in a timely manner and complete a Qualifications Questionnaire Table and a written summary of the responses.

2.2. Based upon the Qualifications Questionnaire Table and written summary, the Executive Selection Committee will short list the most- qualified Proposers for the submission of technical and price proposals.

2.3. The short-listed Proposers will be posted at www.myflorida.com for seventy-two (72) hours. Those Proposers who are not short listed will not be considered further.

Step 3   All short-listed Proposers shall submit technical and price proposals.

Step 4   The Technical Evaluation Committee will evaluate the technical and price proposals.

Step 5   Between the Proposals' due date and the time of oral presentation, the Department reserves the right to perform on-site reviews of the short-listed Proposers' facilities and verifications of their qualifications.

Step 6   All short-listed Proposers will be scheduled to provide an oral presentation (in Tallahassee, Florida) that indicates their firms' capabilities and to participate in a question and answer session on the requested commodities/services. These meetings will be used to share information, exchange innovative ideas, clarify concepts, and improve understanding about the Department's needs, expectations, and the capabilities of each Proposer. The Technical Evaluation Committee and Executive Selection Committee will participate in all presentations. During oral presentations by all short-listed Proposers, the Technical Evaluation Committee and Executive Selection Committee will keep records for the subsequent negotiation to eliminate any unnecessary requirements and to incorporate innovative approaches that the Committees believe would benefit the Department.

Step 7   The short-listed Proposer(s) will be scheduled to meet with the Technical Evaluation Committee to negotiate the Proposer's technical and price proposals and to discuss any issues or problems. The Executive Selection Committee will attend all negotiation meetings as observers.

Step 8   The Technical Evaluation Committee will complete a written summary evaluation of each short-listed Proposer's negotiation.

Step 9   The Executive Selection Committee will review the written summary evaluations and prices to make a final selection or repeat steps 7 and 8 as necessary.

Step 10   The Technical Evaluation Committee will finalize Exhibit "A", Scope of Services, and Exhibit "B", Requirements Specification, through the negotiation process.

Step 11   Based on the agreement of final negotiation, the intended award will be posted at www.myflorida.com in accordance with the law.

Step 12   The Department will execute a contract with the successful Proposer after the Department receives professional liability insurance, a performance bond and any other necessary documents, *e.g.* authorization and licenses.

9.   **CRITICAL EVENTS AND DATES**

The following table indicates critical events and dates for this ITN process and is subject to change:

CRITICAL EVENTS	NEGOTIATION PROCESS	DATES
7.1. ITN Advertisement detail posted at www.myflorida.com.		October 19, 2002
7.2. Deadline for Technical Questions submitted by Proposers.		November 1, 2002, 2:30 P.M. local time
7.3. Deadline for Technical Questions answered by Department and posted at www.myflorida.com.		November 8, 2002, 5:00 P.M. local time
7.4. All ITN Contract or Administrative Questions answered by Department.		October 19, 2002 - Contract Execution
7.5. Deadline for submission of the following forms by Proposers: (1) State of Florida Invitation to Negotiate Acknowledgement Form; (2) Qualifications Questionnaire Form; (3) DBE Participation Statement Form (If Applicable); and (4) Bid Opportunity List Form (If Applicable).	**Step 1**	November 15, 2002, 2:30 P.M. local time
7.6. Deadline for Qualifications Questionnaire Table and written summary prepared by the Technical Evaluation Committee.	**Step 2.1**	November 22, 2002, 5:00 P.M. local time
7.7. Deadline for short listing most-qualified Proposers by the Executive Selection Committee.	**Step 2.2**	December 6, 2002, 5:00 P.M. local time
7.8. Short-listed Proposers posted at www.myflorida.com.	**Step 2.3**	December 9 - 11, 2002
7.9. Deadline for Technical and Price Proposals submitted by short-listed Proposers.	**Step 3**	January 10, 2003, 2:30 P.M. local time
7.10. Deadline for technical and price proposals evaluated by the Technical Evaluation Committee.	**Step 4**	January 24, 2003, 5:00 P.M. local time
7.11. Short-listed Proposers' facilities reviewed by Technical Evaluation Committee (If Necessary).	**Step 5**	January 11 - 31, 2003
7.12. All short-listed Proposers provide oral presentations in Tallahassee, Florida.	**Step 6**	February 3 - 7, 2003

CRITICAL EVENTS	NEGOTIATION PROCESS	DATES
7.13. Negotiations conducted by the Technical Evaluation Committee and Executive Selection Committee with short-listed Proposers.	**Step 7**	February 10 - March 7, 2003
7.14. Deadline for written summary evaluations of negotiations prepared by Technical Evaluation Committee.	**Step 8**	March 14, 2003, 5:00 P.M. local time
7.15. Deadline for final selection made by Executive Selection Committee.	**Step 9**	March 21, 2003, 5:00 P.M. local time
7.16. Deadline for negotiations, Exhibit "A", Scope of Services and Exhibit "B", Requirements Specification finalized by the Technical Evaluation Committee.	**Step 10**	March 28, 2003, 5:00 P.M. local time
7.17. Intended award posted at www.myflorida.com.	**Step 11**	March 31 - April 2, 2003
7.18. Deadline for professional liability insurance, a performance bond, and any other necessary documents received by the Department.	**Step 12**	April 11, 2003, 2:30 P.M. local time

10.   **POSTING**

The Department's shortlist and intended award decision will be posted on the Florida Vendor Bid System at www.myflorida.com, [click on "BUSINESS", click on "Doing Business with the State", under "Everything for Vendors and Customers", click on "Vendor Bid System (VBS)"] under this Negotiation number, and will remain posted for a period of seventy-two (72) hours. The Department will provide by mail, fax, and/or telephone the notice of posting dates and times to all participating Proposers. Any Proposer who believes it has been adversely affected by the Department's intended award must file the following with the Florida Department of Transportation, Office of General Counsel, 605 Suwannee Street, M.S. 58, Tallahassee, Florida 32399-0450.

8.1 A written notice of intent to protest within seventy-two (72) hours after posting of the intended award; and

8.2 A formal written protest and protest bond in compliance with Section 120.57(3), *Florida Statutes*, which is indicated in General Condition 6, State of Florida Invitation to Negotiate Acknowledgement Form.

Failure to file a protest within the time prescribed in Section 120.57(3), *Florida Statutes*, or failure to post the bond or other security required by law within the time allowed for filing a bond shall constitute a waiver of proceedings under Chapter 120, *Florida Statutes*. If the notice advises of the bond requirement but a bond or statutorily authorized alternate is not posted when required, the agency shall summarily dismiss the petition.

11. **QUALIFICATIONS**

Proposers must complete and submit the following forms: (1) State of Florida Invitation to Negotiate Acknowledgement Form; (2) Qualifications Questionnaire Form; (3) DBE Participation Statement Form (If Applicable); and (4) Bid Opportunity List Form (If Applicable) to show that they have the necessary qualifications and experiences in providing the STMCSLS as specified in Exhibit "A", Scope of Services, and Exhibit "B", Requirements Specification. The responses to the Qualifications Questionnaire Form and the information provided by the Proposers in their forms will be reviewed and evaluated to determine the most-qualified Proposers to short list and to proceed with the negotiation process.

12. **AUTHORIZED TO DO BUSINESS IN THE STATE OF FLORIDA**

Foreign corporations and foreign limited partnerships must be authorized by the Department of State to do business in the State of Florida. Such authorization should be obtained by the responses due date and time, but must be obtained prior to posting of the intended award of the contract. For authorization, contact:

Division of Corporations
Florida Department of State
P.O. Box 6327
Tallahassee, FL. 32314
(850) 245-6051

13. **LICENSED TO CONDUCT BUSINESS IN THE STATE OF FLORIDA**

If the commodities/services being provided requires that individuals be licensed by the Department of Business and Professional Regulation, such licenses should be obtained by the responses due date and time, but must be obtained prior to posting of the intended award of the contract. For licensing, contact:

Florida Department of Business and Professional Regulation
1940 N. Monroe St.
Tallahassee, Florida 32399-0797
(850) 488-2014 or (850) 487-1395

14.   REVIEW OF FACILITIES AND VERIFICATION OF QUALIFICATIONS

Between the proposals' due date and the time of oral presentation, the Department reserves the right to perform on-site reviews of the short-listed Proposers' facilities and verifications of their qualifications. These reviews will serve to verify information and representations submitted by the short-listed Proposers and may be used to determine whether the short-listed Proposers have an adequate, qualified, and experienced staff and can provide overall management of its facilities. The reviews may also serve to verify whether the short-listed Proposers have the financial capability to adequately meet the contract requirements. Should the Department determine from the reviews that the short-listed Proposers' proposals have material misrepresentations or that the size or nature of the Proposers' facilities or the number of experienced personnel (including technical staff) is not adequate to ensure satisfactory contract performance, the Department reserves the right to disqualify these Proposers.

15.   COPYRIGHTED MATERIAL

Copyrighted material will be accepted as part of technical and price proposals only if accompanied by a waiver that will allow the Department to make any paper and electronic copies necessary for the use of Department staff and agents. It is noted that copyrighted material is not exempt from the Public Records Law, Chapter 119, *Florida Statutes*. Therefore, such material will be subject to viewing by the public, but copies of the material will not be provided to the public.

16.   CONFIDENTIAL MATERIAL

The Proposers must include any materials it asserts to be exempt from public disclosure under Chapter 119, *Florida Statutes*, in a separate bound document labeled "Attachment to Invitation to Negotiate, Number ITN-DOT-02/03-9025-RR- Confidential Material". The Proposers must identify the specific *Florida Statute* that authorizes exemption from the Public Records Law. Any claim of confidentiality on materials the Proposers asserts to be exempt from public disclosure and placed elsewhere in the questions, forms, proposals, and submittals will be considered waived by the Proposers upon submission, effective after opening.

17.   CONTRACTUAL OBLIGATIONS

The Contract Vendor will be required to ensure that each individual, partnership, firm, or corporation that is part of the Proposer's team by subcontract will be subject to, and comply with, all contractual requirements.

17.1   Public Entity Crimes

A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit proposals on a contract to provide any goods or services to a public entity, may not submit proposals on a contract with a public entity for the construction or repair of a public building or public work, may not submit proposals on leases of real property to a public entity, may not be awarded or perform work as a contract vendor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, *Florida Statutes*, for Category Two (currently $25,000) for a period of thirty-six (36) months from the date of being placed on the convicted vendor list.

17.2   Unauthorized Aliens

The employment of unauthorized aliens by any contract vendor is considered a violation of Section 274A(e) of the *Immigration and Nationality Act*. If the contract vendor knowingly employs unauthorized aliens, such violation shall be cause for unilateral cancellation of the contract.

17.3   Discrimination

An entity or affiliate who has been placed on the discriminatory vendor list may not submit a bid on a contract to provide goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases or real property to a public entity, may not be awarded or perform work as a contract vendor, supplier, subcontractor, or consultant under contract with any public entity, and may not transact business with any public entity.

17.4   Disadvantaged Business Enterprise (DBE) Utilization

The Department encourages DBE firms to compete for Department contractual services projects, and also encourages non-DBE and other minority contractors to use DBE firms as sub-contractors. Vendors are requested to indicate their intention regarding DBE participation on the **DBE Participation Statement** and to submit that Statement with their Technical Response. Submission of this is not mandatory.

Federal law requires states to maintain a database of all firms that are participating or attempting to participate in DOT-assisted contracts. To assist the Department in this endeavor, vendors are requested to submit the **Bid Opportunity List** with their Technical Response. The list should include yourself as well as any prospective sub-contractor that you contacted or who has contacted you regarding the project.

To request certification or to locate DBEs, call the Department of Transportation's Equal Opportunity Office at (850) 414-4747, or access an application or listing of DBEs on the Internet at www.dot.state.fl.us/equalopportunityoffice.

17.5   Liability Insurance

The Contract Vendor shall not commence any work until it has obtained the following types of insurance and the Department has received certificates of such insurance. Nor shall the Contract Vendor allow any subcontractor to commence work on this project until all similar insurance required of the subcontractor has been so obtained. The Contract Vendor shall submit the required Certificates of Insurance to the following contact within ten (10) days after the ending date of the period for posting the intended award decision:

> Florida Department of Transportation
> Central Procurement Office
> 650 Suwannee Street, M.S. 20
> Tallahassee, Florida 32399-0450
> Official Contact Person: Renee Randall
> Phone: (850) 414-4481
> Fax: (850) 922-3019
> Email: renee.randall@dot.state.fl.us

( )   No general liability insurance is required.

( )   The Contract Vendor must carry and keep in force during the period of this Agreement a general liability insurance policy or policies with a company or companies authorized to do business in the State of Florida, affording public liability insurance with combined bodily injury limits of at least $ per person, $ for each occurrence, and property damage insurance of at least $ for each occurrence for the services to be rendered in accordance with this Agreement.

(X) The Contract Vendor must have and maintain, during the period of this Agreement, a professional liability insurance policy or policies, or an irrevocable letter of credit established pursuant to Chapter 675, *Florida Statutes*, and Section 337.106, *Florida Statutes*, with a company or companies authorized to do business in the State of Florida, affording professional liability coverage for the professional services to be rendered in accordance with this Agreement in the amount of one million dollars ($ 1,000,000). The Contract Vendor shall maintain professional liability coverage for a minimum of three (3) years after completion and acceptance of the services rendered herein.

All insurance policies shall be with insurers qualified and licensed to do business in the State of Florida. Such policies shall provide that the insurance is not cancelable except with thirty (30) days prior written notice to the Department.

The Department shall be exempt from, and in no way liable for, any sums of money that may represent a deductible in any insurance policy. The payment of such deductible shall be the sole responsibility of the Contract Vendor and/or subcontractor providing such insurance.

17.6   Standard Terms and Conditions

The Department's Standard Terms and Conditions are applicable and are attached hereto as Exhibit "E", Standard Terms and Conditions, and made a part hereof.

17.7   Performance Bond

A Performance Bond of one million dollars ($1,000,000) is required for this project.

18.   COSTS INCURRED IN RESPONDING

This ITN solicitation does not commit the Department or any other public agency to pay any costs incurred by an individual firm, partnership, or corporation in the submission of a response or to make necessary studies or designs for the preparation thereof, nor to procure or contract for any articles or services.

19.   AWARD OF THE CONTRACT

The Department will execute a written agreement with the awarded Vendor, which will include the final negotiated terms, conditions, scope of services, specifications, and prices.
.

18.   EXHIBITS

1.   Exhibit "A", Scope of Services;
2.   Exhibit "B", Requirements Specification;
3.   Exhibit "C", Proposal Requirements;
4.   Exhibit "D", Evaluation Criteria; and
5.   Exhibit "E", Standard Terms and Conditions.

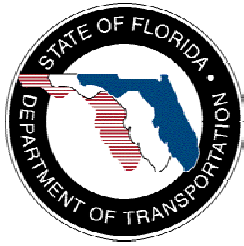## 19.   FORMS

1.   ITN Registration Form;
2.   State of Florida Invitation to Negotiate Acknowledgement Form;
3.   Qualifications Questionnaire Form;
4.   DBE Participation Statement Form (If Applicable); and
5.   Bid Opportunity List Form (If Applicable).

EXHIBIT "A"

SCOPE OF SERVICES

STATEWIDE

TRANSPORTATION MANAGEMENT CENTER

SOFTWARE LIBRARY SYSTEM

**Statewide Transportation Management Center
Software Library System:**

Scope of Services

Prepared for:

Florida Department of Transportation
ITS Office
605 Suwannee Street, M.S. 90
Tallahassee, Florida 32399-0450
(850) 410-5600

September 25, 2002

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Modified By:	John Bonds
Date Modified:	October 16, 2002

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List of Acronyms

AL .... Analog Line
ANSI .... American National Standards Institute
API.. Application Program Interface
ATIS ....Advanced Traffic Information System
ATMS ....Advanced Traffic Management System
C2C .... Center-to-Center
CAD..Computer-Aided Dispatch
CASE...Computer-Aided Software Engineer
CCTV...Closed-Circuit Television
CDRL...Contract Deliverable Requirements List
CM..
DMS .... Dynamic Message Sign
EOC.. Emergency Operations Center
ETC .... Electronic Toll Collection
FDOT..Florida Department of Transportation
FHP ....Florida Highway Patrol
FHWA...Federal Highway Administration
GIS .... Geographic Information System
GUI ....Graphical User Interface
HAR...Highway Advisory Radio
I/F .... Interface
ISP.. Information Service Provider
ITN.. Invitation to Negotiate
ITS.. Intelligent Transportation System
IVR ....Interactive Voice Response
MOU ....Memorandum of Understanding
MWRD... Millimeter Wave Radar (Traffic) Detector
NITSA...National Intelligent Transportation Systems Architecture
NTCIP... National Transportation Communications for ITS Protocol
NTP .... Notice to Proceed
P-Spec...Process Specifications
PERT.. Program Evaluation and Review Technique
PTMC .... Portable Traffic Management Center
RTMC .... Regional Transportation Management Center
RWIS.. Road Weather Information System
SITSA.. Statewide ITS Architecture

1. Project Description

The Florida Department of Transportation (FDOT) intends to acquire the most technically comprehensive advanced traffic management system (ATMS) software available and establish a standard at all traffic management centers (TMCs) throughout the State of Florida. The software must be flexible and expandable to match the individual needs of each TMC. Each TMC will collect, assess, and manage real-time traffic data and video and deliver meaningful and accurate traffic management information to the public and commercial vehicle operators. The primary goals of the Statewide Transportation Management Center Software Library System project are to reduce congestion and delays while responding to traffic incidents in a rapid, accurate, and effective manner. The project will evolve over the next five (5) years through incremental software deployments that are designed to meet specific functionality requirements that are needed by the FDOT districts throughout the State. The proposer shall be a software developer or integrator of TMC software of similar complexity defined in the Scope of Services and Requirements Specification.

## 1.1 Statewide Transportation Management Center Software Library System

FDOT has endorsed the concept of providing a centrally managed, publicly owned set of software modules to completely support all functionality of the regional transportation management centers (RTMCs). This document specifies the system level functional requirements for the software and hardware modules to be purchased or designed and programmed. It is FDOT's desire to acquire software that meets the functional requirements of this specification economically, avoiding custom software development wherever possible. Contract Vendors should propose equivalent functionality of their standard software products if they meet or exceed the requirement. In some cases, it may be more cost effective for FDOT to accept standard, off-the-shelf software modules that do not completely meet the system requirements and, in other cases, FDOT may bear the cost of developing a custom solution for a critical functional requirement unique to Florida. There are software modules in the public domain that shall be evaluated by the Contract Vendor for their applicability to the Statewide Transportation Management Center Software Library System. States that have software available include Georgia, Maryland, and Texas. The State of Florida has four (4) TMC software systems.

1.2 Scope of the Statewide Transportation Management Center Software Library System Project

This document specifies the work tasks for the Contract Vendor or the Contract Vendor Team that provides the Statewide Transportation Management Center Software Library System. The Statewide Transportation Management Center Software Library System project does not include the procurement or deployment of field devices, the provision of physical communications links between field devices and TMCs, or the physical links between TMCs and FDOT, but it does require the software to interface with legacy field devices. A complete list of all the field devices currently in use along Florida's limited-access facilities is provided in Appendix A.

Figure 1.1 depicts the external interface boundaries of the Statewide Transportation Management Center Software Library System that is being procured.

Figure 1.1 – External System Interfaces
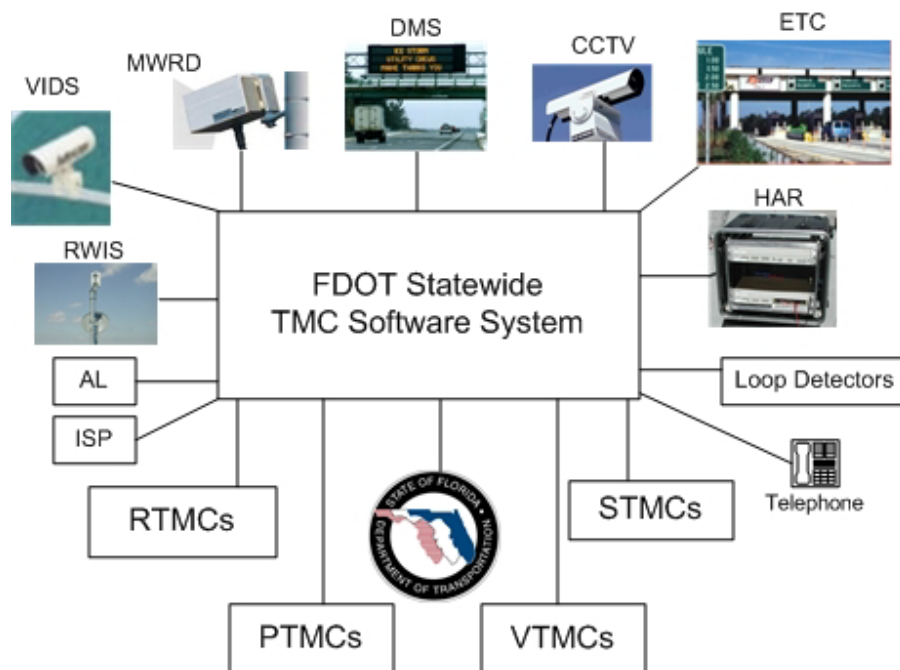
1.3 Traffic Management Center (TMC) Relationships

FDOT has identified four (4) types of TMCs that will connect to each other to provide data backup and temporary assumption of responsibilities in times of disaster. These are:

- RTMCs;
- Satellite or secondary traffic management centers (STMCs);
- Virtual traffic management centers (VTMCs); and
- Portable traffic management centers (PTMCs).

There are ten (10) RTMCs defined in Technical Memorandum No. 4.1 – ITS Corridor Master Plans: Concept of Operations for ITS Deployments along Florida's Principal FIHS Limited-Access Corridors (hereinafter referred to as the ITS Concept of Operations)[1] and each RTMC will connect to STMCs and local TMCs, depending on the needs. Communications links between RTMCs are grouped by districts. There are eight districts identified in the ITS Corridor Master Plans.[2]

The components of FDOT's Statewide Transportation Management Center Software Library System project that are to be developed and delivered under the contract are depicted in Figure 1.2.

Everything within the gray circle is part of the project. The Statewide Transportation Management Center Software Library System will interface with the entities outside the circle. Part of the Contract Vendor's responsibility is to define and document those interfaces. (See Section 3.) The software that accomplishes center-to-center communications shall be developed in accordance with National Transportation Communications for Intelligent Transportation Systems (ITS) Protocol (NTCIP) standards. Also, an interface to a life-cycle asset management software system is required. A brief description of each major component of the Statewide Transportation Management Center Software Library System project is provided in Table 1.1. The Contract Vendor will specify the requirements for the TMC computer equipment to meet the Statewide Transportation Management Center Software Library System needs.

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[1] T*echnical Memorandum No. 4.1 – ITS Concept of Operations*, May 8, 2002. See the link at http://floridaits.com.
[2] The corridors identified in the *ITS Corridor Master Plans* are as follows: Interstate 4 (I-4), Interstate 10 (I-10), Interstate 75 (I-75), Interstate 95 (I-95), and Florida's Turnpike. See http://floridaits.com for more information.

1.3 – Products to be Integrated and Delivered in Phase I
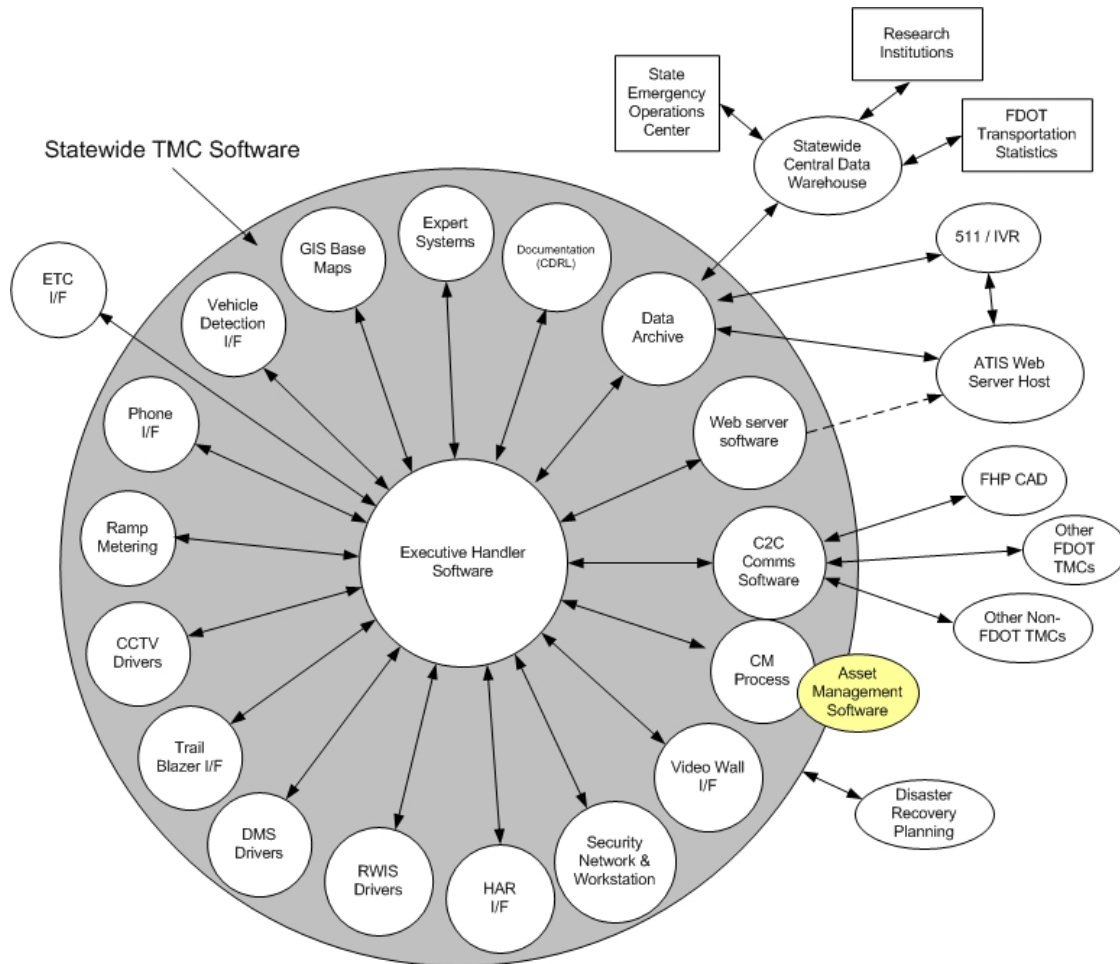
Abbreviations used in Figure 1.2:
I/F = interface
CM = configuration management
C2C = center to center
IVR = interactive voice response

**Table 1.1 – Statewide Transportation Management Center Software
Library System Computer Equipment Requirements**

Component/Item	Description
Field Device Drivers	Appendix A contains a list of all the existing field devices that the Statewide Transportation Management Center Software Library System must interface with. Types include dynamic message signs (DMS), closed-circuit television (CCTV), and vehicle detection devices [i.e., loops, millimeter wave radar detector (MWRD), and vehicle image detector systems (VIDS)].
Road Weather Information System (RWIS)	The Statewide Transportation Management Center Software Library System will interface with the RWIS to get real-time road condition data.
Highway Advisory Radio (HAR)	The Statewide Transportation Management Center Software Library System will interface with HAR to provide messages for broadcasts based on current TMC detected conditions.
Video Wall Interface	The Statewide Transportation Management Center Software Library System will interface with a video matrix switch and video wall system to select and route CCTV video to video displays.
Geographic Information System (GIS) Base Map(s)	The Statewide Transportation Management Center Software Library System will use the FDOT-provided ARC View GIS Map database and update that map database as required for TMC operations.
Expert Systems	The Statewide Transportation Management Center Software Library System will incorporate expert systems software to recommend what response the TMC operators should provide when an event or alarm occurs.
Documentation	The Statewide Transportation Management Center Software Library System will be provided with a complete set of software in accordance with a contract deliverable requirements list (CDRL) contained in this document.
Data Archive	The Statewide Transportation Management Center Software Library System will archive data and provide an interface with the central data warehouse, state and regional 511 systems, and a FDOT traveler information web site.
Web Server Software	The Statewide Transportation Management Center Software Library System shall include web software to present TMC information to travelers seeking travel information through the internet. Hosting of the web software is outside the scope of the TMC software project.
Center-to-Center Communications Interface	The design and specification of Center-to-Center (C2C) communications will be accomplished through a separate contract with the Florida Telecommunications General Consultant (TGC). The interface between the TMC software and the C2C software is subject to technical discussions between the STMCSLS contractor and the TGC, however it is intended that C2C communications be provided or acquired software drivers by TGC and to be used by the TMC software when needed. The STMCSLS contractor shall provide plug-in for C2C communications. An interface control document will be developed to manage the Center-to-Center interface. The TGC and the STMCSLS contractor will jointly develop this interface and its documentation. The Statewide Transportation Management Center Software Library System will use the center-to-center software to communicate with other FDOT TMCs (RTMCs, STMCs, VTMCs, and PTMCs), as well as with other city TMCs, emergency operations centers (EOCs), emergency management responder sites, transit, etc.

Component/Item	Description
Life-Cycle Asset Management	The Statewide Transportation Management Center Software Library System will interface with external life-cycle asset management software to track TMC software and hardware assets.
Configuration Management	The Statewide Transportation Management Center Software Library System will provide a process and software as required to manage the configuration of a TMC. This function is expected to also interface with the external life-cycle asset management software.

1.4 Technical Requirements

The functional requirements the Statewide Transportation Management Center Software Library System must meet are specified in a separate document titled *Statewide Transportation Management Center Software Library System: Requirements Specification* (hereinafter referred to as the *Requirements Specification*). All technical requirements are uniquely identified by a letter-number combination and address what functions the system must provide. In some cases, an architecture is assumed for the context of the requirement; however, it is FDOT's intention to acquire the TMC software system in the most cost-effective manner possible. TMC software that is already available in the public domain or public sector should be first considered since FDOT's goal is to acquire software source code and complete documentation in addition to fully integrated and tested executable object software.

1.4.1 FDOT Flexibility

FDOT recognizes the need to be able to adjust its technical requirements through negotiations with the Contract Vendor, where necessary, to avoid costly software customization or to adjust the definition of certain functional requirements to meet the capabilities of available software products. Instances in the technical functional specifications that describe architectures or even a specific software designs should be taken as a guide to interpreting the requirements and not necessarily a requirement to use a specific design. However, there may be some cases where FDOT's functionality needs require a specific architecture or implementation. These instances will be identified during final Contract Vendor negotiations.

1.5 Contract Type

FDOT intends to award a purchase order for the first phase of the Statewide Transportation Management Center Software Library System that is for a fixed-price amount. Before the award of the contract, FDOT and the Contract Vendor will agree on the functional requirements that will be met and the process that will be followed to verify that all the requirements are satisfied. Section 3 of this document describes the work breakdown structure for the project.

1.6 Software Ownership

It is an objective for FDOT to own the Statewide Transportation Management Center Software Library System source code with sufficient documentation, training, and environment development tools for contract vendor-trained, FDOT-designated personnel to maintain the software. Prior to the start of software design, the contractor shall baseline all software that is provided as the starting point for the STMCSLS software.

2. Applicable Documents

The following documents of the exact issue shown form a part of this document to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this *Statewide Transportation Management Center Software Library System: Scope of Services* (hereinafter referred to as the *Scope of Services)*, the contents of this *Scope of Services* shall be considered the superseding requirement.

Table 2.1 – Applicable Documents

Document	Publisher and Address
Statewide Transportation Management Center Software Library System: Requirements Specification Draft dated June 28, 2002	PBS&J FDOT ITS Office 605 Suwannee Street, M.S. 90 Tallahassee, Florida 32399-0450 (850) 410-5600 http://www11.myflorida.com
Statewide ITS Architecture (SITSA)	FDOT ITS Office 605 Suwannee Street, M.S. 90 Tallahassee, Florida 32399-0450 (850) 410-5600 http://www11.myflorida.com
National ITS Architecture (NITSA), Version 4.0	Federal Transportation Authority Department of Transportation Washington, D.C. http://www11.myflorida.com
FDOT Contracts Administration Topic No.375-000-001-j District Contracts July 30, 1999	Florida Department of Transportation Contracts Administration 605 Suwannee Street Tallahassee, Florida 32399-0450 http://www11.myflorida.com
State of Florida Department of Transportation Standard Terms and Conditions Procurement Doc. No. 375-040-44 January 2002	Florida Department of Transportation Contracts Administration 605 Suwannee Street Tallahassee, Florida 32399-0450 http://www11.myflorida.com
State of Florida Department of Transportation Contractual Services Agreement Governmental Agencies Procurement Document No. 375-040-17 OGC February 2002	Florida Department of Transportation Contracts Administration 605 Suwannee Street Tallahassee, Florida 32399-0450 http://www11.myflorida.com

Table 2.1 (Continued)

Document	Publisher and Address
ITS Corridor Master Plans: Concept of Operation for ITS Deployments along Florida's Principal FIHS Limited-Access Corridors May 8, 2002	FDOT ITS Office Contracts Administration 605 Suwannee Street Tallahassee, Florida 32399-0450 http://www11.myflorida.com
TMC Software Study Florida Department of Transportation ITS Office November 15, 2001	Southwest Research Institute P.O. Drawer 28510 6220 Culebra Road San Antonio, Texas 78228-0510 http://www11.myflorida.com
Introduction to an Operational Concept for the Florida Statewide Library March 31, 2002	Southwest Research Institute P.O. Drawer 28510 6220 Culebra Road San Antonio, Texas 78228-0510 http://www11.myflorida.com
District Corridor ITS Architecture Database Microsoft Access file format	PBS&J FDOT ITS Office 605 Suwannee Street, M.S. 90 Tallahassee, Florida 32399-0450 (850) 410-5600 http://www11.myflorida.com

3.   Scope of Work

The FDOT's ITS Office is responsible for providing a safe transportation system that ensures the mobility of people and goods, enhances economic prosperity, and preserves the quality of our environment and communities. In support of this mission, the ITS Office developed Technical Memorandum No. 5.2 – A Strategic Approach to ITS Deployment Prioritization for Florida's Principal FIHS Limited-Access Corridors (available at http://floridaits.com). This approach is a master plan for improving transportation throughout the State on its limited-access corridors that led to a study of traffic management software. One of the study recommendations adopted by FDOT was the implementation of a Statewide Transportation Management Center Software Library System.

The scope of work described in this section is a general guide and is not intended to be a complete list of all the work necessary to complete the project. The scope of work contains work tasks believed necessary to provide FDOT with a Statewide Transportation Management Center Software Library System that will meet their needs.

The selected Contract Vendor shall implement a comprehensive, fully integrated suite of applications that will comprise an integrated Statewide Transportation Management Center Software Library System covering the general functional areas and specific requirements detailed in the Requirements Specification.

3.1   Contract Obligations

FDOT will be responsible for:

- Appointing a project manager;
- Forming a TMC Software Steering Committee;
- Providing all existing documentation in FDOT's possession on the equipment and systems required to interface to the Statewide Transportation Management Center Software Library System;
- Coordinate the documentation for an interface to Center-to-Center communications software and hardware.
- Reviewing, providing comments, and approving the detailed work plan, design, test plans, test procedures, product submittals, and other documentation deliverables;
- Closely monitoring the project's implementation progress and schedule;
- Providing reasonable facility access and staff support;
- Actively participating in integration testing, acceptance testing, implementation, and training; and
- Providing GIS map databases in ESRI ARCView format.

3.1.1 Contract Vendor's General Obligations

The prime Contract Vendor and its subcontractors will be responsible for:

- Providing a project manager and key project team members;
- Providing a master project schedule using Microsoft Project 2000 software with significant milestones in program evaluation and review technique (PERT) and GANTT format;
- Providing software detailed design and integration with complete software system design documentation, including plug-in to Center-to-Center communications and an interface control document jointly coordinated by TGC and contract vendor;
- Providing the special test equipment needed during training and testing and any other equipment needed to implement a complete and functioning system;
- Identifying the minimum hardware requirements for system implementation, as FDOT will be furnishing the TMC computer-related equipment and the networks for system integration and testing;
- Scheduling and coordinating with the FDOT ITS Office's Statewide Transportation Management Center Software Library System project manager to ensure adequate network infrastructure and data links are provided by FDOT;
- All application and system software required to implement the functional capabilities of the Statewide Transportation Management Center Software Library System project;
- Integrating all software into an operational system;
- Testing all functional capabilities of the system;
- Providing network and workstation security;
- Packing, shipment, insurance, and delivery of all parts, training and maintenance materials, submittals, and documentation to FDOT, as directed;
- Implementing a rigorous, structured integration methodology;
- Implementing a rigorous configuration management system;
- Implementing and executing a formal software development process;
- Providing staged installation, start-up, and checkout of the system using the FDOT Statewide Transportation Management Center Software Library System test bed;
- Engineering and programming technical support for FDOT during the contract period;
- Completing documentation for all hardware (as applicable) and software training, including a complete operator/administrator manual, user and service documentation, and the drawings listed in Section 4;
- All necessary software licenses;
- Inventory control and asset management of all hardware, software, and documentation;
- Training of FDOT-designated personnel;
- Project management and control, including periodic progress meetings with, and reporting to, FDOT staff;
- Maintenance and support of the system for the duration of the contract;
- Standard warranty services for the duration of the contract;

- Post-implementation maintenance support for delivered software within the contract period, renewable in one year increments; and
- Hardware for software development and factory integration and testing.

3.1.2 FDOT ITS Office and Traffic Management Center (TMC) Steering Committee General Obligations

FDOT, or its designated representative, will be responsible for:

- Providing computer hardware in accordance with approved specifications, networks, and software to include field device drivers;
- Providing network infrastructure and furnishing and activating the appropriate physical data connections inside facilities to the various project-related communications networks;
- Providing the technical data currently in FDOT's possession and the control necessary for detailed software system design;
- Reviewing and approving the Contract Vendor's software system design;
- Reviewing and approving the Contract Vendor's integration and testing program;
- Reviewing and approving the Contract Vendor's test procedures;
- Witnessing the Contract Vendor's test procedures and approving the test reports;
- Reviewing and approving the Contract Vendor's installation schedule and procedures;
- Reviewing and approving the system documentation;
- Participating in the testing, training, and start-up of the system;
- Approving a Contract Vendor-supplied template for original technical documentation;
- Providing a formal, final acceptance of the Statewide Transportation Management Center Software Library System; and
- Providing definition on the content and capabilities of the Statewide Transportation Management Center Software Library System.

3.2   Project Tasks

The Contract Vendor shall develop a set of software system requirements that are an interpretation of the functional requirements contained in the *Requirements Specification*. The Contract Vendor is expected to conduct a detailed design of the software system necessary to implement the functional system requirements and those software requirements will be reviewed and approved by FDOT at formal reviews as specified herein.

3.2.1 Task 1 – Project Management (Prime Contract Vendor)

Project management will be a key responsibility of the Statewide Transportation Management Center Software Library System Contract Vendor. The Contract Vendor's project manager shall have the authority to make commitments and decisions that are binding within the limits of the agreement. FDOT will designate a project manager to coordinate all FDOT project activities. All communications between FDOT and the selected Contract Vendor shall be coordinated through their respective project managers.

At a minimum, the Contract Vendor's project manager will be responsible for:

- Organizing a project team and identifying key team members and their specialties;
- Providing periodic updates to the work plan and schedules. Changes to the work plan and schedules that exceed ten percent (10%) of the baseline require approval by FDOT;
- Submitting monthly project status reports detailing progress towards fulfilling the objectives in the work plan and its project schedule, highlighting items on the critical path, and reporting on the status of risk mitigation efforts;
- Coordinating project resources and work so that milestones are met in an efficient manner. Tasks will be laid out to minimize implementation time and costs while taking into consideration resource and time constraints such as FDOT staff availability. The Contract Vendor and FDOT project managers will ensure that individuals performing tasks have appropriate skill levels and credentials;
- Coordinating all required deliverables, installation and configuration of software, and hardware, data conversion, documentation, and training as described herein;
- Participating in monthly project meetings at a designated FDOT facility;
- Proactively managing risks in accordance with the approved Risk Mitigation Plan (CDRL Item #1-7.2).

3.2.1.1 <u>Administrative Reports</u>

FDOT requires the deliverables indicated below from the Contract Vendor in order to monitor progress and ensure compliance (refer to CDRL Section 4.0):

- **Detailed Work Plan –** The Contract Vendor shall develop a detailed work plan listing all the tasks the Contract Vendor will perform to fulfill the requirements of the Statewide Transportation Management Center Software Library System contract. At a minimum, the work plan shall contain a detailed work breakdown structure that is keyed to the level of cost and schedule reporting. The work plan may incorporate the staffing plan and schedule or it may reference them.

- **Risk Management Plan –** The Contract Vendor shall develop a risk mitigation plan that identifies project risks and possible ways to mitigate those risks. The Contract Vendor shall report on the status of each identified risk in the monthly progress report until that risk is fully mitigated. Risks shall be classified as Cost, Schedule, and/or Technical. Even though the contract is a firm fixed-price contract, it is critical that the Contract Vendor keep FDOT informed of any potential impacts to cost and what steps the Contract Vendor is taking to mitigate the cost impact. It is in FDOT's best interest for the Contract Vendor to meet their cost and schedule commitments and FDOT will actively support the Contract Vendor in achieving those commitments. When new risks are identified, revisions to the plan shall be issued.

  The Contract Vendor shall, at a minimum, address the following potential risk areas:

  o Development of new software modules;
  o Platforms for integration and testing;
  o Adequate technology transfer of the Statewide Transportation Management Center Software Library System;
  o Stability of hardware suppliers;
  o Inability of hardware suppliers to meet NTCIP standards; and
  o System security.

- **Staffing Plan –** The Contract Vendor will identify the key individuals to be involved in the project during negotiations and indicate in the staffing plan the number of personnel assigned to each element of the work breakdown structure with key individuals identified. A key individual is defined as a person who is a task leader or individual contributor with specialized knowledge applicable to the project. No key individual may be removed or substituted on the project without approval by FDOT.

- **Detailed Schedule (PERT with a GANTT Summary) –** The Contract Vendor shall develop a detailed PERT diagram based on the work breakdown structure and work plan that, at a minimum, identifies:

  o   Earliest start dates for a tasks;
  o   Latest start dates for tasks;
  o   Earliest end dates for tasks;
  o   Latest end dates for tasks;
  o   Schedule slack time in days;
  o   Duration of tasks in days [minimum increment is one (1) day];
  o   Task names and task numbers;
  o   Resoursce(s) needed; and
  o   Critical path information.

  The PERT chart shall be used to generate the GANTT chart. The Contract Vendor shall edit the GANTT chart to show major tasks only and shall clearly identify the key project milestone dates. The PERT chart shall be used to manage the critical path. Project baseline schedule and costs shall not be changed without FDOT's approval. The summation of schedule changes relative to a baseline of less than ten percent (10%) shall not warrant a change in baseline.

- Draft and final documentation as required; and

- **Monthly Progress Reports –** The Contract Vendor shall prepare a progress report each month to be provided to FDOT by the fifth day of the next month. The progress report shall include the following items:

  o An updated project schedule with explanations of any deviations from the planned delivery schedule. The explanation shall include the anticipated impact of any delays and a plan for returning to the target schedule. All delays shall be factored into the project schedule as soon as the Contract Vendor's project manager is aware of them. In addition, all changes to the schedule since the last progress report shall be identified;
  o An updated list of all correspondence transmitted and received;
  o An updated documentation schedule that highlights the documents to be transmitted for review during the next two (2) reporting periods;
  o An action item database in Microsoft Access shall be established and maintained to support closure of action items in a timely manner. Open action items shall be discussed weekly with FDOT. An updated list of Contract Vendor and FDOT action items with status information and the required resolution dates shall be included as part of the monthly progress reports;
  o A summary of pending and upcoming Contract Vendor and FDOT activities during the next two (2) reporting periods along with required completion dates;
  o The status of unresolved contract questions and change requests;
  o A description of current and anticipated project problem areas or risks and the steps to be taken to resolve each problem; and
  o The status of the critical path and of deliverables listed in the CDRL.

3.2.1.2   Administrative Meetings

The selected Contract Vendor's project manager shall participate in progress review meetings and conduct project review presentations as requested by FDOT.

- **Kick-Off Meeting –** The Contract Vendor shall present an initial kick-off meeting at an FDOT facility. The purpose of this meeting is to have the Contract Vendor present its plan for developing specific project work tasks for implementation of assigned work. Key Contract Vendor staff assigned to this effort shall attend this kick-off session. The kick-off meeting shall be held within twenty (20) working days after the initiation of the Notice to Proceed (NTP) and is anticipated to last one (1) day (approximately 9:00 A.M. to 4:00 P.M.). The objective of the kick-off meeting is to review any exceptions or deviations proposed by the Contract Vendor, review the Contract Vendor's proposed project plan, staffing plan, schedule, budget, and technical risk factors. The Contract Vendor shall be responsible for preparing and distributing kick-off meeting materials to the FDOT project manager and preparing and submitting the minutes of the meeting. FDOT will provide a meeting facility with a computer projection unit upon request.

- **Progress Review Meetings –** Progress review meetings will be scheduled by FDOT to occur monthly and will be attended by the Contract Vendor's project manager, key technical leads as appropriate, and subcontracted personnel as appropriate. FDOT will notify the Contract Vendor's project manager ten (10) working days prior to a scheduled meeting and may request that the Contract Vendor provide an agenda and list of prospective attendees for the review. FDOT will review and approve the proposed agenda and the list of Contract Vendor attendees. No Contract Vendor or subcontractor personnel shall attend a project status review meeting without prior approval by FDOT.

  Progress review meetings will be conducted at an FDOT facility. Progress meetings shall be used to review the Contract Vendor's monthly progress report, written correspondence exchanged since the last meeting, open action items, obtain clarifications, request information, and discuss future activities. The Contract Vendor will record the minutes of each meeting and forward a copy to FDOT within five (5) working days of meeting adjournment for review and approval.

- **Outreach Presentations –** The selected Contract Vendor shall also participate in outreach meetings as requested by FDOT to inform and educate the Statewide Transportation Management Center Software Library System's stakeholders regarding aspects of the project and to review proposed requirement changes. When appropriate, these outreach meetings will be conducted as extensions to the progress meetings. The Contract Vendor shall record the minutes of each meeting and forward a copy to FDOT for review and comment. For budgetary purposes, the Contract Vendor shall plan on five (5) outreach presentations a year during the Contract period with material sufficient to cover two (2) hours of discussion.

3.2.1.3   Transmittal of Deliverables

Every document, letter, progress report, change order, and any other written or computer-readable material (in written or electronic form) exchanged between the Contract Vendor and FDOT shall be assigned a unique transmittal number. The Contract Vendor shall maintain a correspondence index and assign transmittal numbers consecutively for all Contract Vendor documents and/or discussions.

FDOT will maintain a similar correspondence numbering scheme identifying the documents and correspondence that it creates. The Contract Vendor shall provide FDOT a copy of the Contract Vendor's correspondence index upon request.

The Contract Vendor shall provide ten (10) hard copies of each deliverable and one (1) electronic version. Electronic versions shall be compatible with Microsoft Office 2000®

and Adobe PDF formats. The Contract Vendor shall maintain a single project schedule using the Microsoft Project 2000® application.

3.2.1.4   Change Procedures

The following procedures shall apply to all engineering and design changes proposed by the Contract Vendor for any equipment, interface, integration, or software requirement in this contract. The Engineering Change Proposal shall be submitted for review and acceptance by FDOT.

The Contract Vendor shall submit an Engineering Change Request when a change in the scope of the contract is needed. Changing the technical scope of the contract must be justified in the Engineering Change Proposal.

The process of reviewing Engineering Change Proposals shall be as follows: The Contract Vendor shall indicate in the Engineering Change Proposal the impact of the proposed change on the Contract in regards to technical and operational issues, quality assurance, scheduling, and financial issues. FDOT, if required, will negotiate with the Contract Vendor the content and any price adjustments or schedule changes involved. FDOT-approved Engineering Change Proposals will be processed by FDOT as a Supplemental Agreement or as otherwise legally appropriate. A formal amendment to the Contract will be issued by FDOT to incorporate approved Engineering Change Proposals as required. The Contract Vendor shall undertake no work unless the Engineering Change Proposal is approved by FDOT.

3.2.2 Task 2 – Software System Detailed Design

The detailed software design and specification process is referred to as the front-end work tasks that are depicted in Figure 3.1.

3.2.2.1   Software configuration baseline

FDOT requires the contractor establish a software configuration baseline prior to the start of software design and software coding. The purpose is to establish what software is provided by the contractor prior to modification or the development of new software. Before any software development begins, contractor's software that will serve to be the foundation of the TMC Software system shall be documented to establish a baseline for configuration management of what software is developed specifically for the STMCSLS project including what software is modified and to what degree it has been modified for the project. The baseline documentation shall also include a list of commercial software that is, or will be included along with its version number.

To establish a baseline configuration, Computer Software Configuration Items (CSCIs) will be identified as Baseline 0 and source code provided to FDOT. A hardcopy of the annotated baseline CSCIs will accompany the electronic version. If an entire executable software package represents the baseline, then a demonstration of the software shall be provided to FDOT in addition to copies of the CSCIs and any relevant documentation describing the Baseline 0 software system.

Figure 3.1 – Software System Design Task Overview
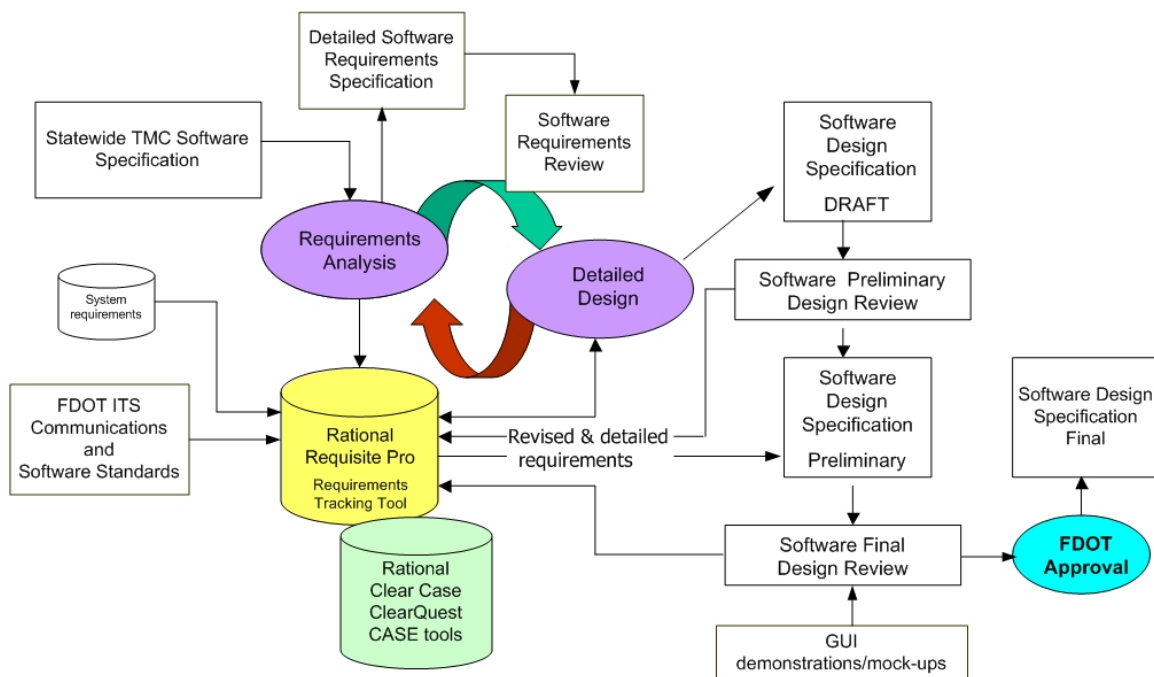
3.2.2.2   Requirements Analysis

As part of the contract negotiation process, the Contract Vendor and FDOT will agree on a mutual understanding of the functional system requirements as specified in the Statewide Transportation Management Center Software Library System specifications. FDOT will revise the specifications to reflect the mutually approved set of system functional requirements. FDOT has captured all the system requirements as well as the stakeholder needs in a requirements tracking tool that uses the Filemaker Pro database application. Further, FDOT has linked the system requirements to stakeholder requirements and to User Service Requirements from Version 4.0 of the *NITSA* database. The Contract Vendor shall use Rational Software's development tools to manage the software development for the Statewide Transportation Management

Center Software Library System project. An early step in the process is to review the system functional requirements and allocate them to software functions. In general, the requirements database is implemented as a flat file database with *NITSA* requirements linked through a relational database subset. The requirements in the FileMaker Pro database can be exported in a variety of formats that the Contract Vendor can import into the Requisite Pro requirements tracking tool.

The product of the requirements analysis shall be a software requirements specification that, at a minimum, describes the software architecture, the functional modules, and the high-level data flows between the functions.

3.2.2.3 Concept of Operations

The Contract Vendor shall revise and publish a final version of the Introduction to an Operational Concept for the Florida Statewide Library document published by the Southwest Research Institute. This document is available from the FDOT ITS Office upon request and can be considered seventy percent (70%) complete. It consists of 53 pages and is available in Microsoft Word 2000 format.

3.2.2.4 Interface Verification

The Contract Vendor shall contact each field device manufacturer to determine the current driver software for the field devices and work with FDOT to obtain licensed copies of the drivers for inclusion in the Statewide Transportation Management Center Software Library System. NTCIP-compliant drivers are the goal for FDOT and if there are NTCIP-compliant drivers for the legacy field devices, the Contract Vendor shall obtain those software drivers for inclusion in the Statewide Transportation Management Center Software Library System. It can be assumed that FDOT will provide the Contract Vendor with copies of the existing software drivers owned by FDOT.

The Contract Vendor shall define the external interfaces to the Statewide Transportation Management Center Software Library System and internal interfaces between major functional parts. All interfaces shall be documented in a Statewide Transportation Management Center Software Library System interface design specification that, after implementation, shall be revised to reflect the as-built configuration. Upon revision, the interface design specification shall become the Statewide Transportation Management Center Software Library System's interface control document.

3.2.2.5 <u>Requirements Management</u>

FDOT has selected Rational Software's Requisite Pro as a FDOT ITS standard for software development. The Statewide Transportation Management Center Software Library System's software requirements shall be defined and tracked via the tool Requisite Pro from Rational Software. This tool shall be used to capture, organize, and communicate to the project team all requirements of the System's development. The Contract Vendor shall update the requirements document via Requisite Pro on a periodic basis during the phased implementation or when major new releases are fielded according to the approval of FDOT. At a minimum, the requirements shall be delivered to FDOT at the software requirements review via media transfer of the content of the Contract Vendor's Requisite Pro information. FDOT has version 2002.05.00 of Requisite Pro.

All requirements shall be identified by a unique code that is descriptive of the function being specified.

3.2.2.6   Software System Detailed Design

Only after FDOT approves the software requirements specification shall the Contract Vendor conduct a detailed design of the Statewide Transportation Management Center Software Library System. The detailed design requirements shall be maintained and tracked through the use of the Requisite Pro requirements tracking tool. All software design requirements shall trace to a system functional requirement on a child-to-parent basis. There shall only be one parent for each child requirement; however, there can be many children for each parent requirement. For the requirements specification, this is illustrated in Figure 3.2. A similar relation is required for the software design requirements that will bridge to the Statewide Transportation Management Center Software Library System's functional requirements.

Figure 3.2 – Statewide Transportation Management Center
Software Library System's Functional Requirements Hierarchy
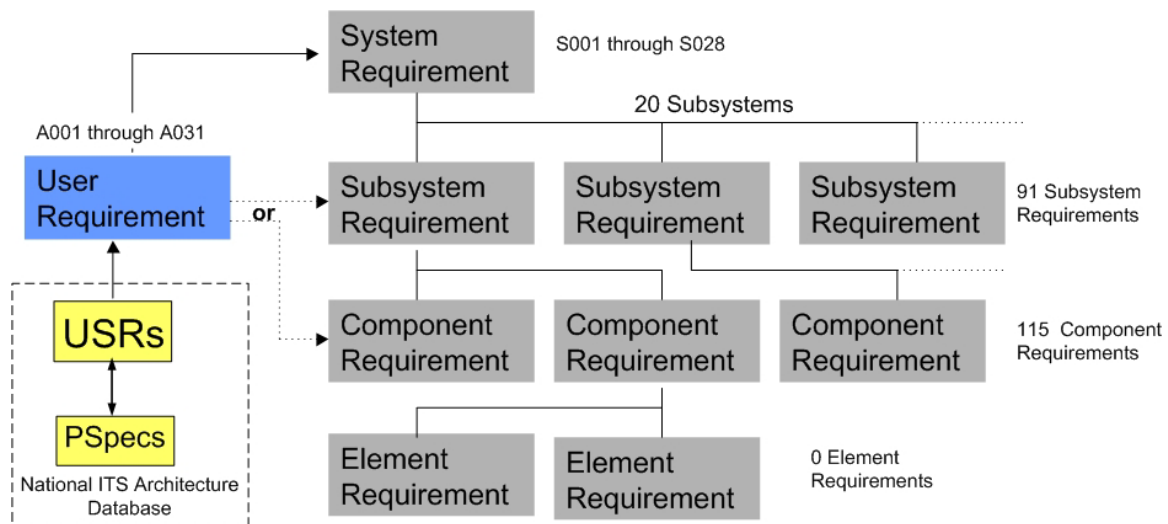
In Figure 3.2, a subsystem requirement is a parent for related component requirements and a subsystem requirement is a child of a system level requirement. The complete set of Statewide Transportation Management Center Software Library System requirements' relationships can be found in the Requirements Traceability Matrix that is contained in Table 4.2 of the *Requirements Specification*.

The product of the detailed system design is a preliminary and final Statewide Transportation Management Center Software Library System design specification.

- **Software Design Specification –** The Contract Vendor shall deliver a software design specification draft for FDOT's review and comment. The draft shall include all parts of the requirements and the requirements dictionary. The software design specification shall be reviewed at a software preliminary design review. (See the Software System Detailed Design above). After the review of the draft, the Contract Vendor shall incorporate recommended changes and deliver a final software design specification in printed and electronic format.

- **Software Development Plan –** Although it is FDOT's objective to minimize software development, some software development is expected as part of the Statewide Transportation Management Center Software Library System project. A Contract Vendor-developed and FDOT-approved software development plan shall be adhered to for any software developed for the Statewide Transportation Management Center Software Library System.

  The software development plan shall be a key document created by the Contract Vendor to demonstrate the understanding of the software requirements and to define the approach to the software development. The software development plan shall serve as a detailed plan for implementing the Statewide Transportation Management Center Software Library System. The software development plan will illustrate how the Contract Vendor proposes to organize, specify, develop, test, install, and maintain the software specified in this Invitation to Negotiate (ITN). The software development plan shall include detailed information on schedules, allocated resources, methodology, standards, technical approach, risk, and other items pertinent to a complete software development plan. The software development plan shall identify all tools to be utilized during the development process.

  The software development plan shall be developed by the Contract Vendor and submitted for review and approval by FDOT ten (10) working days prior to the software requirements review. The software development plan will be updated and maintained by the Contract Vendor over the course of the development cycle. The software development plan has two primary purposes:

  o To serve as a document against which the Contract Vendor's understanding of the software requirements and approach to software development is measured; and
  o To serve as a viable, ongoing, detailed plan by which the Contract Vendor shall develop the Statewide Transportation Management Center Software Library System.

  In order for the software development plan to be a viable, ongoing document, the Contract Vendor shall update and submit the software development plan for review and approval by FDOT at the software preliminary design review and the

software final design review. The software development plan shall provide FDOT with detailed knowledge of the schedule, organization, and resources allocated by the Contract Vendor.

The software development plan shall address the software embedded in its environment and include all software and hardware interfaces. The protocol used to communicate between hardware components shall be specified. Graphical depiction of the system architecture shall be provided. Performance of the application software with system constraints, timing constraints, and optional technical approaches shall be analyzed and identified.

- **Software Security Plan –** The software security plan shall include security against both internal and external threats. A comprehensive security plan shall be enacted that covers:

  o   What data and critical systems need to be protected?
  o   What are the threats to these critical components?
  o   What is the likelihood that each of these threats could occur?
  o   What are the impacts should a specific threat affect a specific component?

  Once these considerations have been examined, the software security plan should begin by specifically addressing threats that are most likely to occur and that would have the most severe impact to operations, and should then work back toward threats that are least likely to occur or that would have the least impact.

  The software security plan shall specifically include a program to address denial of service attacks as well as electronic mail and network-based virus attacks.

- **Software Quality Assurance Plan –** The Contract Vendor's software quality assurance plan shall specify how compliance with the software development plan will be monitored. The software development team shall include one or more software quality assurance personnel who are solely tasked with making sure the software is developed in accordance with the software development plan. The software quality assurance plan may be a separate document or may be a section of the software development plan.

- **Detailed Design Requirements –** The minimum requirements for the detailed design of the Statewide Transportation Management Center Software Library System is contained in Table 3.1.

- **Database Design –** The Contract Vendor shall utilize the Oracle Designer 2000 computer-aided software engineer (CASE) tool or an equivalent structural

design/CASE tool approved by FDOT during the database design. The product shall have the following advantages:

o Single point of truth for application meta data; and
o Accurate analysis of system requirements.

The database design transformer builds database schema like tables, columns, indexes, and constraints. The application design transformer builds modules definition for screens and reports.

The Contract Vendor shall obtain the appropriate number of licenses for the Oracle database and the CASE tool from the FDOT database administrator[3] and shall use personnel trained in the use of the tools.

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[3]   FDOT's database administrator is Charles O. Adkison, (850) 414-9216, clint.adkison@dot.state.fl.us.

**Table 3.1 – Statewide Transportation Management Center
Software Library System Detailed Design Minimum Requirements**

Area	Requirement
System Architecture	Detailed definition of databases, processing, and communications nodes will exist and will contain their geographic locations. All the major components of the system shall be defined along with their interrelationships. The table design shall be created via a structured query language (SQL) where all the entities and entity designs are implemented, all the foreign keys are identified, and all table names shall relate to the source entity. In addition: • All the data volumes shall be specified; • All the normalization shall to be implemented and if for any reason de-normalizations are listed, they shall be documented. • All the tables shall have a primary key. • All the tables shall have a description that includes design considerations and decision trees for sub-type implementations, • For each column, all the following shall be defined: format, data type, size, percentage null, null/not null, description, and domain checks. All the referential integrity constraints shall be defined.
Index Design	There shall be a unique index on the primary key for each table. If the primary key is on a single column, the column should be not null. Concatenated keys shall be on not null columns. The order of the concatenated indexed fields shall be documented. All of the foreign keys shall index with the non-unique indexes.
Module Definition	All the module definitions or specifications shall be defined with the Oracle Designer 2000 CASE tool. The module definition shall have a header, user overview, and a technical overview. It shall contain process logic and insertion, change, and deletion rules. The tables and columns used and modes used shall specify the vehicle for implementation and degree of complexity. All assumptions shall be listed with limit and exception handling.

Area	Requirement
Database	All of the physical partitions, areas, or other subdivisions on the disks shall be defined. All of the operating system file usage shall be documented. There shall be a clear definition between logical and physical schema.
Views	The view name shall indicate the purpose. The derivation of each view shall be documented. Each view shall have a description and all the view-specific referential integrity checks shall be defined.
Physical Database Design	A physical database design report shall be provided and shall include: - System architecture; - Program module architecture for key programs; - Specification of manual procedures; - System network definition overview; - Cross-reference to full design documentation in the Oracle Designer 2000 CASE tool data dictionary; - Physical database design overview; - Tables and space usage; - Indexes and space usage and spacing; - Transition strategy, if any; - Development of environmental specifications; - Draft operations documentation; and - Major assumptions and key issues.

- **Hardware –** The Contract Vendor shall specify workstation computers that are open in architecture and non-vendor specific. For example, if a hard drive, memory, or other component(s) should fail, such components shall be available from several manufacturers. Also, workstation hardware shall be upgradeable using hardware from any of several manufacturers. Finally, if a workstation computer fails, such workstation hardware can be purchased as a whole computer from any manufacturer. Workstation computers shall have a minimum configuration as follows:

  o Pentium IV or higher processor running at the latest speed (2 GHZ or higher);
  o 256 MB of RAM;
  o 20 GB or larger disk drive;
  o Video card with 65-128 MB of RAM, capable of a 1024x768 resolution or higher; and
  o 10/100 Ethernet card.

  The Contract Vendor shall provide FDOT with all the software and output of the CASE tools at the beginning of the project for software review and testing.

3.2.2.7   Technical Reviews

- **Software Preliminary Design Review –** The Contract Vendor shall conduct a software preliminary design review at an FDOT facility. Each software build design shall be formally reviewed at a software preliminary design review. The number of reviews shall depend on the Contract Vendor's implementation plan. For budgetary purposes, the Contract Vendor shall state how many software preliminary design reviews are budgeted in the proposal.

  The Contract Vendor's software engineering team shall not begin coding of any software until the software preliminary design review is completed to the satisfaction of FDOT and FDOT has authorized the Contract Vendor to proceed with the software coding. Coding for the purpose of evaluating the feasibility of an approach in order to reduce implementation risk is authorized without FDOT approval so long as the code developed is clearly identified to FDOT and not reused in the deliverable software (i.e., throw away code). The software preliminary design review shall be held no later than thirty (30) working days after release of the draft of the software design specifications but no earlier than ten (10) working days to provide enough time for the technical and management team at FDOT to review.

  FDOT will review and comment on the software design specifications draft. As a minimum, each software preliminary design review shall:

o Provide an overview of what software modules are included in the software build under review;

o Describe what functions the software build will provide;

o List the functional modules that make up the software build and how they relate to the architecture;

o List what requirements will be satisfied by each module;

o Provide the schedule for detailed design and unit testing and identify the software engineer that will provide the detailed design, code, and test for each functional module; and

o Provide a list of what resources will be needed both by the Contract Vendor and FDOT to support the design, coding, and unit testing of each module.

- **Software Final Design Review –** A software final design review will be held for the software modules that comprise a software build. The software final design review shall be held no later than when twenty percent (20%) of the software build has been coded as a result of feedback provided by FDOT after the software preliminary design review.

3.2.3 Task 3 – Software System Implementation

After approval of a software build's design, the Contract Vendor shall begin code and unit testing of the software in accordance with the approved design. The implementation of the software shall generally follow the process depicted in Figure 3.3.

Figure 3.3 – Software Implementation Process
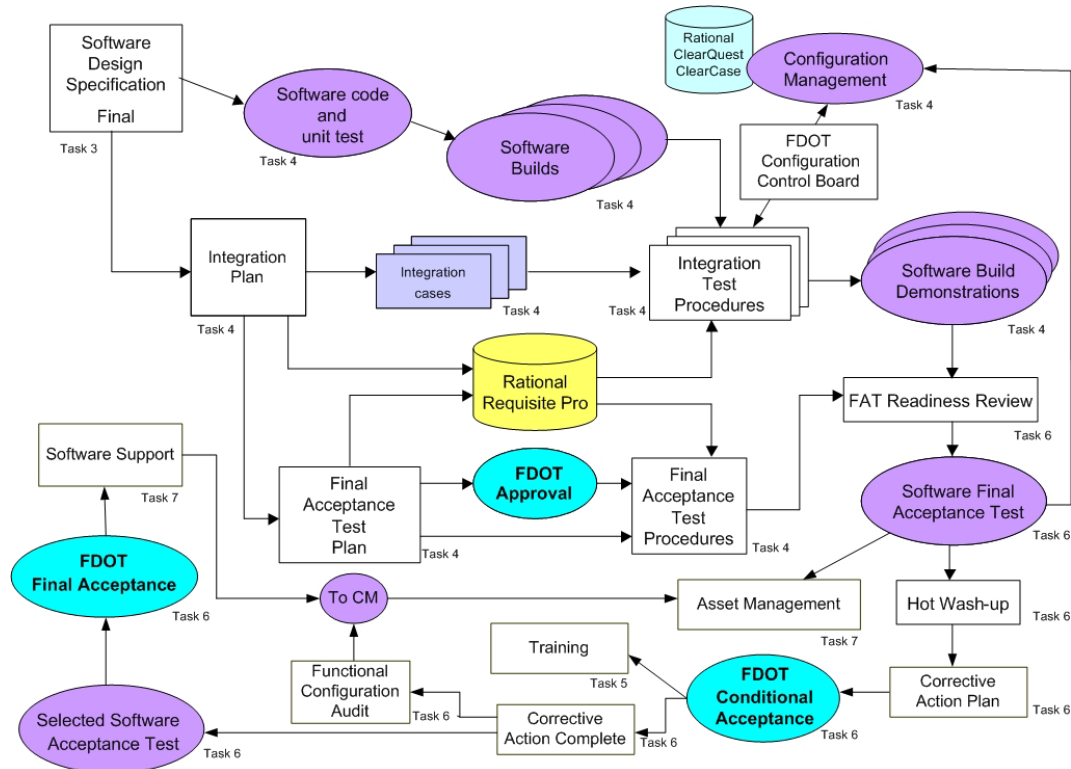
There are two major tasks associated with software implementation. The first is code and unit testing of the software and the integration of the software units into working modules that comprise a functional software build. The second task is to verify that the software build works and satisfies the functional system requirements. The integration and testing task is addressed separately from the code, unit testing, and build integration. The Contract Vendor shall be responsible for all integration and testing mentioned above.

The Contract Vendor shall develop software in accordance with the FDOT-approved software development plan and tested in accordance with the FDOT-approved software quality assurance plan. For software that is not developed or modified, the Contract Vendor shall integrate and test the software in accordance with the FDOT-approved software quality assurance plan.

The Contract Vendor shall be responsible for verifying that the Statewide Transportation Management Center Software Library System meets the requirements of the software final design specification.

While the Contract Vendor is responsible for providing software that meets the system functional requirements, FDOT is responsible for verifying that the software builds meet the functional system requirements.

3.2.4 Task 4 – Software Code and Unit Testing and System Integration and Testing

The Contract Vendor shall develop the Statewide Transportation Management Center Software Library System in accordance with the Contract Vendor-developed, FDOT-approved software quality assurance plan.

FDOT and the Contract Vendor will agree on a set of functions that can be effectively demonstrated as a part of the logical implementation of the Statewide Transportation Management Center Software Library System. This approach, called functional thread testing, is designed to build confidence that the project is on track and meets its requirements and to identify problems early to permit resolution within schedule and budget constraints.

- **Integration Plan –** The Contract Vendor shall develop an integration plan that identifies specific functionality of a system build that satisfies a set of system requirements for the Statewide Transportation Management Center Software Library System. A software build that supports specific functions is called an integration case. The Contract Vendor shall identify a minimum of three (3) and up to a maximum of six (6) logical integration cases. Each integration case shall be formally identified as a Statewide Transportation Management Center Software Library System milestone and the System's functions shall be formally demonstrated by the Contract Vendor for FDOT and invited guests. For planning purposes, the Contract Vendor can assume that software demonstrations will take place on the Statewide Transportation Management Center Software Library System test bed at an FDOT facility. This facility will replicate all external interfaces with a pilot installation period at the FDOT district facility currently planned to be the FDOT District 4 Broward County RTMC and District 6 Miami RTMC [pending resolution of the Memorandum of Understanding (MOU) between District 4, District 6 and the FDOT ITS Office]. FDOT shall approve the integration plan.F

- **Software Test Plan –** The Contract Vendor shall develop a software test plan that describes the test approach in accordance with the software quality assurance plan contained in the *Requirements Specification*. The software test plan shall address software design requirements. FDOT shall review and approve the software test plan.

- **Software Test Procedures –** The Contract Vendor shall develop test procedures for each software build identified in the integration plan. The test procedures are expected to be executed by Contract Vendor personnel and shall be in sufficient detail to ensure that the test results are repeatable and meet the test objectives. Pass/Fail criteria shall be identified and the requirements being verified by the test procedure shall be clearly identified. FDOT shall review and

approve the test procedures. In some cases, FDOT or its designated representative may perform the testing.

- **Software Test Reports –** The Contract Vendor shall publish a report of each software test conducted and shall deliver to FDOT a formal test report for each integrated software build tested. Delivered test reports shall at a minimum contain:

  o Summary narratives of the test results;
  o Identification of problems or failures;
  o Recommended resolutions of anomalies observed; and
  o Copies of witnessed data sheets.

- **Milestone Demonstrations –** In accordance with the integration plan, the Contract Vendor shall demonstrate specific Statewide Transportation Management Center Software Library System functionality at formal milestone demonstrations in accordance with FDOT-provided milestone demonstration procedures. Prior to a formal demonstration, the software builds shall be thoroughly tested in accordance with FDOT-approved test procedures.

- **Software Documentation –** Software documentation shall be provided in accordance with the CDRL in Section 4.

- **Configuration Management –** The configuration management system shall be ClearCase and ClearQuest from Rational Software. The advantages of automated configuration management system software cannot be underestimated given the complexity and life cycle of the Statewide Transportation Management Center Software Library System. FDOT will use this tool to manage the Statewide Transportation Management Center Software Library System acquisition under this Contract and the ongoing changes to the System. The Contract Vendor shall deliver to FDOT, on an approved schedule, the output of the ClearCase software. At a minimum, the Contract Vendor shall deliver to FDOT the update of the ClearCase software for every build/new release approved by FDOT.

  The Contract Vendor shall use ClearCase to manage the versioning capabilities for all file system artifacts, including directories and binary file formats. In addition to the source code, the build and release engineer shall manage and version the compliers, linkers, system libraries, and other binary artifacts. In addition to the build environment, the Contract Vendor shall utilize ClearCase to maintain the versions of the requirements, documentation, test scripts, and Web content.

In the software development environment, the Contract Vendor shall establish a paradigm for source code modification where the software engineer will check-out the code, perform the edits, and check-in the code to create a new build.

- **Configuration Management System Reporting** – The Contract Vendor shall utilize ClearQuest from Rational Software for a unified change management process. The Contract Vendor shall track and report the status of the new requirements being implemented, the severity of the software bugs, the status of resolutions, and relate the status through ClearCase reporting. All software defects and new features shall be tracked and reported. The Contract Vendor's project manager shall maintain "To Do Lists" for all project members with ClearQuest.

3.2.5 Task 5 – Training

The selected Contract Vendor shall provide sufficient training to the FDOT personnel as required for successful implementation and operation of the Statewide Transportation Management Center Software Library System. The length of sessions proposed per training type must be adequate to cover the required material in sufficient depth for the trainees to perform their responsibilities on the System. FDOT employs a "train-the-trainer" training philosophy with a maximum utilization of Contract Vendor-generated course materials.

The Contract Vendor shall provide a list of the types of training required, recommended courses, content, length, and proposed schedule as part of the their proposal.

FDOT plans to maintain the Statewide Transportation Management Center Software Library System using FDOT-designated personnel. The training and software documentation provided by the Contract Vendor shall support that objective. Screen shots of operator displays should be used where appropriate.

FDOT will provide classroom space in a mutually satisfactory facility in the State of Florida. Class size per session is limited to ten (10) students. For budget purposes, the Contract Vendor can plan on a total student population of 100.

The Contract Vendor shall submit a training plan that will be reviewed by FDOT. No training shall occur until FDOT approves the training plan.

The training courses are classified into three (3) general categories as outlined below. The Contract Vendor's response to this *Scope of Services* shall outline a training program that describes the courses to be developed for each of the following categories:

- **Software Design/Maintenance –** Courses in this category shall be developed to provide personnel who have backgrounds in similar software languages with the knowledge required to maintain and operate the software provided under this Contract.

  The Contract Vendor shall create courses for the computer systems analyst and/or programmer and to train FDOT technical staff in the following:

  o   All software modules for the Statewide Transportation Management Center Software Library System;
  o   Database tables and relationships;
  o   Stored procedures;
  o   Application program interfaces (API); and
  o   Software development tools.

  These courses shall be oriented toward the maintenance of the application source code. All training shall be at a Florida site as designated by FDOT.

- **System Administration/Deployment –** Courses in this category shall be developed to provide technical personnel who have background in systems administration, networking, computer operations, and software installation with the necessary skills to operate and maintain a TMC.

- **Operator/User Interaction –** Courses in this category shall be designed to train the TMC workstation operators in the complete and thorough operations of a TMC. The training material shall include the maintenance of all database tables, the varied methods of communications in response to a traffic incident, and the control and display of maps and icons.

- **Training Plan, Training Aids, and Materials –** The Contract Vendor shall submit a detailed and comprehensive training plan and training materials for each course developed in the above categories to FDOT for review and approval forty (40) working days prior to the scheduled start of any training. The Contract Vendor shall revise the training plan(s) until approved by FDOT. No course training shall be conducted without an approved training plan(s).

  The training plan(s) shall include a lesson plan for each course detailing the literature, standard operating procedures, manuals, and test materials that will be used.

  The training plan(s) shall describe the Contract Vendor's management role and responsibilities for each course. The training plan(s) shall include a training schedule listing each period of instruction and the time required for each period. The Contract Vendor shall not train more than ten (10) people in a period of

instruction. The number of training personnel per course will vary depending upon the course subject.

All training aids and training materials for each course, including written proficiency tests, charts, graphs, videos, support documents, and any other media, shall become the property of FDOT.

3.2.6 Task 6 – Final Acceptance

The formal acceptance of the Statewide Transportation Management Center Software Library System is treated as a distinct and separate task. The formal acceptance of the System marks the point in the contract where the Contract Vendor shifts from development to support. FDOT will use a final acceptance test to verify that the Statewide Transportation Management Center Software Library System meets all of its system requirements as specified in the *Requirements Specification*. It is expected that an independent third party or FDOT will develop a system acceptance test plan and final acceptance test procedure. The Contract Vendor shall review and comment on the system acceptance test plan and the final acceptance test procedure and shall support FDOT or their designated representative in conducting the final acceptance test procedure. The Contract Vendor shall assume that there will be three (3) complete dry runs of the final acceptance test procedures that will take approximately three (3) working days each to complete, with five (5) working days between dry runs to correctly verify the Statewide Transportation Management Center Software Library System requirements.

- **Functional Configuration Audit –** The Contract Vendor shall support FDOT in auditing the contract deliverables and software configuration. This audit shall document the as-built configuration of the Statewide Transportation Management Center Software Library System.

- **Final Acceptance Test Readiness Review –** The Contract Vendor shall attend a FDOT-hosted final acceptance test review that shall be held no sooner than one (1) working day prior to the commencement of the formal final acceptance test and no later than the start of the final acceptance test. The purpose of the final acceptance test readiness review is to verify that the Statewide Transportation Management Center Software Library System is ready for formal testing and that the Contract Vendor and FDOT agree on the scope of the testing, the criteria for acceptance, the testing ground rules, and the process to follow for resolution of any discrepancies resulting from the final acceptance test. At a minimum, the final acceptance test readiness review shall:

  o Review the status of any test discrepancies resulting from the integration case testing;
  o Review the test procedures and agree on pass/fail criteria for each test; and

o   Review and agree on the process for resolution of any test irregularities.

- **Final Acceptance Test –** The Contract Vendor shall support FDOT and/or their designated representative in conducting the formal final acceptance test. The final acceptance test shall take place at an FDOT-designated site. For planning purposes, the Contract Vendor shall assume that the final acceptance test will take place at an FDOT facility.

- **Hot Wash-Up –** A hot wash-up denotes an immediate review of a process or a test and is used to verify that all participants perceived the same results or to identify significant differences of opinion on the results of the process or test. Immediately after testing, FDOT will convene a meeting with the Contract Vendor's project manager, test director, FDOT management, and the FDOT test director to discuss the results of the testing and agree on a preliminary list of actions that may result from the final acceptance test. FDOT will publish the minutes of the hot wash-up and the Contract Vendor shall provide review and comment.

- **Final Acceptance Test Report –** FDOT will generate a final acceptance test report. The Contract Vendor shall review and comment on the report.

- **Corrective Action Plan –** The Contract Vendor shall generate a plan to correct any deficiencies noted by FDOT in the final acceptance test report. In some cases, no corrective action may be required if the Contract Vendor's analysis of the reported anomaly does not constitute a failure of the Statewide Transportation Management Center Software Library System. At a minimum, the corrective action plan shall address each final acceptance test discrepancy noted in the final acceptance test report by:

  o   Noting the test procedure where the discrepancy was observed;
  o   Noting what requirements were not met and by how much;
  o   Providing a description of the problem and its impact on the suitability and functionality of the Statewide Transportation Management Center Software Library System;
  o   Providing a description of possible solutions;
  o   Providing any interim work-around procedure recommended until the problem is fixed;
  o   Providing an estimated schedule for how long it will take to correct the problem and test the software; and
  o   Noting what FDOT resources are needed to support the Contract Vendor in fixing the problem.

  FDOT will review and approve the corrective action plan. In some cases, the Contract Vendor may request a deviation or waiver for the requirement(s) not

met. FDOT has the discretion to approve the request and either seek consideration or a contract adjustment.

- **Deviation –** The Contract Vendor may request a deviation from a stated requirement if the Statewide Transportation Management Center Software Library System can be shown to provide an equivalent functionality. A formal deviation request shall be submitted in accordance with the process and format that will be described in the final acceptance test plan. FDOT has the discretion to accept or reject a deviation request. If accepted, the requirement will be re-written to reflect the new functionality and documentation will be revised accordingly.

- **Waiver –** The Contract Vendor may also request a waiver for a requirement that is not met due to a design or implementation error. A waiver may be granted by FDOT to accept the system as-is with the proviso that the problem will be fixed in accordance with the Contract Vendor-furnished, FDOT-approved corrective action plan within the approved schedule. If a fix for the problem proves impractical for the Contract Vendor, FDOT may grant the waiver to accept the system as-is if the Contract Vendor provides commensurate consideration for the lack of specified functionality and there is an acceptable work-around procedure for FDOT. FDOT may also reject the waiver request and require that the Contract Vendor meet its obligations under the contract.

3.2.6.1 Software Ownership

All software developed under this contract shall be considered work for hire and is the property of FDOT. The software ownership shall include the source code and documentation. At all times, FDOT shall have access to the source code and its documentation for the purpose of modification, enhancement, or distribution. FDOT shall distribute the software to the RTMCs as required and may distribute the software to other states.

3.2.7 Task 7 – Software Support

The Contract Vendor shall maintain the Statewide Transportation Management Center Software Library System for the term of the contract. Updates, which include all changes, enhancements and problem fixes, shall be provided to FDOT at a mutually agreeable time. All releases and new builds shall be first processed through the configuration management software and approved for release by FDOT. The Contract Vendor shall provide FDOT with all software development records. The Contract Vendor shall provide, to the designated FDOT project manager and software support person, all related information during scheduled monthly meetings in order to support the preparation of Help Desk requirements. All updated software shall first be tested on the Statewide Transportation Management Center Software Library System test bed before

it is released for distribution. If an emergency release is required, the Contract Vendor shall provide FDOT with necessary details.

3.2.8 Task 8 – Modifications for the Surface Transportation Security and Reliability Information System Model Deployment (Optional Service)

FDOT is submitting an application to be the model deployment of a system focused on enhancing the security and reliability of the surface transportation system through the widespread availability of real-time information. Should FDOT be granted this award, the Statewide Transportation Management Center Software Library System may require the addition of software that supports predictive analysis of surface transportation reaction to incidents based on the fusion of real-time sensor data and historical trends. District 5 (Orlando and the surrounding area) will be the site of the model deployment and the Statewide Transportation Management Center Software Library System installed at District 5 will require additional software modules needed to support the functions of the model deployment system.

This optional task will require that the Statewide Transportation Management Center Software Library System design be modified to address the model deployment. The specific scope of work, functional requirements, effort, and fees will need to be identified and negotiated upon the award of the model deployment by the Federal Highway Administration (FHWA). It can be expected that additional travel, reviews with the FHWA, and support provided for model deployment demonstrations will be required. If being selected, the tentative schedule for model deployment will be as follows:

Table 3.2 – Tentative Model Deployment Schedule

Date	Activity
January 2003	Notice to Proceed (NTP)
January 2003 – August 2003	Planning and Final Deployment Plan
August 2003 – December 2004	Deployment / Installation / Testing and Acceptance
January 2005 – December 2006	Evaluation

4. Contract Data Requirements List (CDRL)

The Contract Vendor shall develop and mandate a standard set of documents for all ITS software development projects. Review of the software engineering life cycle demonstrates that only twenty percent (20%) of a product's life-cycle cost is spent in the development phase. Over eighty percent (80%) of the life-cycle cost of the software is expended in the maintenance/enhancement phase. To utilize the fund efficiently, a well-documented system is critical. A well-documented software system can be characterized by the existence of documentation external to the system and internal to the source code. The external documentation describes the software operation, requirements, design, and interfaces. Whereas internal documentation is found within the software source code and describes what function a particular section of source code is intended to accomplish, both types of documentation are necessary to have a well-documented software system. Many software developers suggest the "elimination" of documentation in an effort to reduce development cost. This approach to system documentation results in systems that are more costly to maintain and, more importantly, cause the State to be dependent on the author of the source code for any changes.

The documents listed in the CDRL are standard for software development projects procured by government agencies. The State will consider it unacceptable to reduce or eliminate the scope of the documentation task because of a lack of budget; instead, functionality should be trimmed with the State's concurrence in an effort to assure any software that is delivered is appropriately documented. Note that in some cases, documents may be combined. The Contract Vendor's standard company format is acceptable so long as it is applied consistently and contains the required information. FDOT will review and approve the Contract Vendor-proposed documentation format for each deliverable. The use of electronic formats (i.e., HTML-based documents) is acceptable.

Table 4.1 – Contract Deliverable Requirements List (CDRL)

Deliverable Number	Title	Due Date
1-1.1	Detailed Work Plan Draft	Ten (10) working days after issuance of NTP
1-1.2	Detailed Work Plan Final	Ten (10) working days after receipt of FDOT's comments
1-2	Staffing Plan	Ten (10) working days after issuance of the NTP
1-3	PERT Schedule	Twenty (20) working days after issuance of the NTP
1-4	Gantt Summary Schedule	Twenty (20) working days after issuance of the NTP
1-5.n	Monthly Progress Reports	Reports are due on the first Monday of each month after the issuance of the NTP
1-6	Kick-Off Meeting	Twenty (20) working days after issuance of the NTP
1-6.1	Kick-Off Meeting Materials	No later than thirty (30) working days prior to the meeting
1-7.1	Risk Mitigation Plan Draft	Twenty (20) working days after issuance of the NTP
1-7.2	Risk Mitigation Plan	Ten (10) working days after receipt of FDOT's comments
1-7.2.n	Risk Mitigation Plan Revision	As needed
1-8.1.n	Administrative Meeting Minutes Draft	Within five (5) days after meeting adjournment
1-8.2.n	Administrative Meeting Minutes Final	Within three (3) days after receipt of FDOT's comments
1-8.3.n	Administrative Review Presentation Materials	No later than five (5) working days prior to the scheduled meeting date
5-1.1	Training Plan Draft	No later than forty (40) working days prior to the scheduled start of training
5-1.2	Training Plan Final	Within ten (10) working days after receipt of FDOT's comments
2-1.1	Software Requirements Specification Draft	No later than five (5) working days prior to the software requirements review
2-1.2	Software Requirements Specification Final	Within ten (10) working days after receipt of FDOT's comments
2-2.n	Output from Requisite Pro	Within software requirements specification draft and with all other draft and final technical design deliverables
2-3	Logical Database Design	No later than five (5) working days prior to the software requirements review
2-4.1	Software Development Plan Draft	No later than ten (10) working days prior to the software requirements review
2-4.2	Software Development Plan Final	Ten (10) working days after receipt of FDOT's comments
2-5.1	Software Quality Assurance Plan Draft	No later than forty (40) working days after issuance of the NTP
2-5.2	Software Quality Assurance Plan Final	Ten (10) working days after receipt of FDOT's comments
2-6.1	Software Security Plan Draft	No later than forty-five (45) working days after issuance of the NTP
2-6.2	Software Security Plan Final	Ten (10) working days after receipt of FDOT's comments

Table 4.1 (Continued)

Deliverable Number	Title	Due Date
2-7.1	Software Design Document Draft	No later than 120 working days after the software requirements specification
2-7.2	Software Design Document Final	Ten (10) working days after receipt of FDOT's comments
2-7-3	Interface Design Specification	No later than ten (10) working days before the software requirements review
3-1.1	Software Integration Plan Draft	No later than ten (10) working days prior to the first software preliminary design review
3-1.2	Software Integration Plan Final	Ten (10) working days after receipt of FDOT's comments
3-2.1	Software Acceptance Test Plan Draft	No later than ten (10) working days prior to the first software final design review
3-2.2	Software Acceptance Test Plan Final	Ten (10) working days after receipt of FDOT's comments
3-3.1.n	Software Test Procedures Draft	No later than thirty (30) working days prior to the integration test
3-3.2.n	Software Test Procedures Final	Ten (10) working days after receipt of FDOT's comments
3-4.n	Software Test Reports	Within ten (10) working days after completion of each test
6-1	Interface Control Document	No later than ten (10) working days prior to the Functional Control Audit
6-2	Functional Configuration Audit	Complete no later than three (3) working days prior to the formal final acceptance test
6-3	Final Acceptance Test Readiness Review	No earlier than one (1) day before test and no later than the day the final acceptance test commences
6-4	Hot Wash-Up Minutes (Comments)	Within five (5) working days after receipt of the minutes
6-5	Final Acceptance Test Report (Comments)	Within ten (10) working days after receipt of report
6-6	Version Description Document	Upon software build release
6-7.1	Software User's Manual	Upon software build release
6-7.2	Software User's Manual Updates	As required

5. Notes

5.1 Standards and Guidelines for Software Development

The Contract Vendor shall utilize all of the tools and standards specified in this section or shall propose an equivalent. The Contract Vendor may request a wavier of a certain tool or standard. The request shall be addressed in the Contract Vendor's proposal and is subject to negotiation. The Contract Vendor shall provide FDOT with access to all the tools used for the software development of the Statewide Transportation Management Center Software Library System. FDOT will apply these tools during testing. The Contract Vendor shall verify with FDOT what software tools are available in the FDOT inventory that will be used for the Statewide Transportation Management Center Software Library System development and testing.

5.1.1 Requisite Pro

The Statewide Transportation Management Center Software Library System requirements shall be defined and tracked using Requisite Pro from Rational Software. For budgetary purposes, the Contract Vendor should assume responsibility for Requisite Pro licenses for the duration of the contract period.

5.1.2 Configuration Management System

The configuration management system shall be ClearCase and ClearQuest from Rational Software. FDOT will use this tool to manage the Statewide Transportation Management Center Software Library System acquisition under this contract and the changes to the ongoing System.

The Contract Vendor shall use ClearCase to manage the versioning capabilities for all file system artifacts, including directories and binary file formats. In addition to the source code, the build and release engineer shall manage and version the compliers, linkers, system libraries, and other binary artifacts. In addition to the build environment, the Contract Vendor shall utilize ClearCase to maintain the versions of the requirements, documentation, test scripts, and Web content.

In the software development environment, the Contract Vendor shall establish a paradigm for source code modification where the software engineer will check-out the code, perform the edits, and check-in the code to create a new build.

5.1.3 Configuration Management System Reporting

The Contract Vendor shall utilize ClearQuest from Rational Software for a unified change management process. The Contract Vendor shall track and report the status of the new requirements being implemented, the severity of the software bugs, the status

of the resolutions, and relate the status through ClearCase reporting. The Contract Vendor's project manager shall maintain "To Do Lists" for all project members with ClearQuest.

5.1.4 Oracle Designer (6i or 9i) 2000

The Contract Vendor is expected to use the Oracle Designer 2000 Case tool product during the database design. FDOT will supply a sufficient number of licenses to the Contract Vendor for the use of the Oracle Case tool.

5.1.5 C/C++ Standards

When given the option between operating system specific functions and American National Standards Institute (ANSI)-compliant functions, software should be written to ANSI standards. This will improve the portability of the software and serve as a measure of future proofing against being hooked into any particular operating system. ANSI-compliant headers and system functions should be used, as opposed to operating system-specific header files and system functions.

The developer is expected to employ the coding standards applicable to the individual organization, but the standards are expected to be applied consistently to all the source code in the code base. At a minimum, the following guidelines should be followed:

- The code base should be separated by source code files based on logical modules. Modules that are expected to be called by more than one other module should be separated by source code file.

- Individual source code files should include a comment block indicating the purpose of the module, the functions or objects contained in the file, and a list of other source code files required. A comment block indicating the purpose of the function should precede each function contained in the source code file.

- Developers should avoid the use of hard-coded values, particularly when referring to static values associated with external systems. The use of configuration files is preferred to embedding hard-coded values in the code.

5.1.6 Java Standards

Developers should avoid the use of proprietary extensions of the Java language and strictly adhere to the open standards. When given the option between operating system-specific Java extensions and open source functions, software should be written to open source standards. This will improve the portability of the software and serve as a measure of future proofing against being locked into any particular operating system.

ANSI-compliant headers and system functions should be used, as opposed to operating system-specific header files and system functions.

The developer is expected to employ the coding standards applicable to the individual organization, but the standards are expected to be applied consistently to all the source code in the code base. At a minimum, the following standards should be met:

- Individual source code files should include a comment block indicating the purpose of the module, the classes or objects contained in the file, and a list of other source code files required. A comment block indicating the purpose of the class should precede each class contained in the source code file.

- Developers should avoid the use of hard-coded values, particularly when referring to static values associated with external systems. The use of configuration files is preferred to embedding hard-coded values in the code.

5.1.7 Graphical User interface (GUI) Standards

The graphical user interface (GUI) workstation's primary function is to display DMS, video cameras, ramp meters, incidents, and all other devices on a highway road map, so the operator may easily view the overall traffic situation by looking at an on-screen map. The software shall be map-oriented and driven. The operator should be able to click or right-click on any device on a map and, based on security permissions, control the device, send messages to it, see the message on a sign, enter incidents at the location selected, and all other associated duties without having to go to another terminal or launch separate software that is not launched by the map.

5.1.8 Workstation Operating System

The operating system for the TMC workstation shall be Windows XP Professional or the latest Windows Professional software based on the Windows NT/2000 kernel. Windows XP Professional is based on years of proven performance and reliability in the Windows NT operating system.

5.1.9 Server Operating System

FDOT uses Windows 2000 servers for its database clusters installed in each district for various critical business functions. FDOT has found the Windows 2000 operating system to be sufficiently scalable for the Statewide Transportation Management Center Software Library System. A UNIX Operating system is not desired because FDOT feels it is more costly to maintain and it is not FDOT's standard for a server operating system.

5.1.10 Map Display Software

ArcView software by ESRI shall be used to provide the complete map and device display. ArcGIS modules may be used to extend ArcView by providing multi-user editing, advanced analysis, Internet services, and high performance spatial database services. FDOT will supply the GIS map database to the Contract Vendor.

5.1.11 Custom Map Software

Where custom software is needed that exceeds the capability of the ArcView software, MapObjects by ESRI will be used.

5.1.12 Oracle Database Client Software

Windows-based software such as Delphi and Visual C++ shall be provided to update the Oracle database tables. Such software should allow the system administrator to enter new devices and device parameters, maintain lookup tables and lists, and run reports specified during the requirements phase of the system. The client software will integrate with the map display, to allow clicking the mouse on a map device and controlling or editing parameters for the device (user permissions based).

5.2 Contract Data Item Description

The following describe some of the content required for key contract deliverable documents. In some cases, the documentation is required only for software developed specifically for the FDOT Statewide Transportation Management Center Software Library System project. FDOT does not expect a Contract Vendor to develop specific documentation for previously developed or standard software sold commercially.

5.2.1 Operations Concept Document

The Operations Concept Document shall describe the system's function at a high-level. The Operations Concept Document will be used to describe the intended functions of a system in a form that should be readable by a wide variety of audiences. The operations concept document will serve as input into the requirements process. The Contract Vendor shall be required to complete the Introduction to an Operational Concept for the Florida Statewide Library published by the Southwest Research Institute.

5.2.2   Software Requirements Specification

The software requirements specification shall specify the requirements and interface requirements for a software item and the methods to be used to ensure that each requirement has been met. The software requirements specification shall provide the customer with "what" will be needed. The software requirements specification shall be used as the basis for the design and qualifications testing of a software item.

5.2.3   Soft Design Document

The software design document shall describe the design of the software configuration item. The soft design document shall also describe the software configuration item-wide design decisions, the software item architectural design, interface characteristics, and the detailed design needed to implement the software. The soft design document shall provide FDOT visibility into the design and information needed for software maintenance. A soft design document shall be required for any software configuration items developed specifically for the Statewide Transportation Management Center Software Library System. It does not apply to software provided that is comprised of at least fifty percent (50%) existing, unmodified source code.

5.2.4   Interface Control Document

Interface control documents shall be developed for any software that interfaces to another piece of software or hardware external to the Statewide Transportation Management Center Software Library System. Interface control documents shall provide detailed, bit/byte-oriented information that allows two different software developers to develop to a well-defined common interface.

5.2.5   Version Description Document

The version description document shall identify and describe a software configuration item version consisting of one or more software modules. The version description document shall be used to release, track, and control software versions and will tell how to build and install a software version. The term "version" may be applied to the initial release of the software, to a subsequent release of that software, or to one of multiple forms of the software released at approximately the same time (i.e., to different sites).

5.2.6   Software Acceptance Test Plan

The Statewide Transportation Management Center Software Library System software acceptance test plan shall describe the test preparations, the software test environment, the tests to be performed, the schedule for test activities, and the test cases and procedures to be used to perform qualifications testing for a software item or a software system or subsystem. The software acceptance test plan will enable the customer to

access the adequacy of the qualifications testing to be performed and, if applicable, the software system qualifications testing. There is usually a single software acceptance test plan for a project.

5.2.7   Software User's Manual

The software user's manual shall inform a hands-on software user how to use a software item, a group of related software items, or a software system or a subsystem. The software user's manual may also cover a particular aspect of software operation, such as instructions for a particular position or task. The software user's manual shall be developed for software that is run by the user and will have a user interface requiring an on-line user's input or interpretation of displayed output. If the software is embedded in a hardware-software system, user manuals or operating procedures for that system may make separate software user's manuals unnecessary.

5.2.8   Software Integration Plan

The software integration plan shall describe the plan for integrating the Statewide Transportation Management Center Software Library's subsystems into the districts' TMCs. The software integration plan will include the identification of the schedule for integration, the points of contact, the documentation needed, the software to be installed, and any equipment that will be utilized. The software integration plan will also describe the process that will be followed for performing the integration. This process may be very detailed, describing activities on an hourly basis. The software integration plan will be developed, reviewed, and approved by the State and its districts prior to the installation of the Statewide Transportation Management Center Software Library System.

Appendix A

Florida's Existing Field Devices

Table A.1   Make, Manufacturer, and Model Number of Existing Field Devices

District	Facility	Device Type	No. of Devices	Device Manufacturer	Detector Controllers	Video Switch	CODECS	Serial Data Transmission Format	Video Transmission Format	Video Distribution Format at TMC
1	I-75	ETC	1							
2	I-10	CCTV	13	Diamond						
2	I-10	DMS	2	Telespot, Vultron						
2	I-10	Fiber	5.502							
2	I-10	HUB	2							
2	I-10	RWIS	1							
2	I-10	VIDS	41							
2	I-295	AL	4							
2	I-295	CCTV	4	Diamond						
2	I-295	DMS	1	Telespot, Vultron	2070	Javelin	None	Serial over fiber	Analog	Analog
2	I-295	Fiber	2.884							
2	I-295	LD	1							
2	I-295	RWIS	1							
2	I-295	VC	14.637							
2	I-95	AL	4							
2	I-95	CCTV	5	Diamond						
2	I-95	DMS	5	Telespot, Vultron						
2	I-95	VC	10.484							
3	I-10	CCTV	2							
3	I-10	DMS	2							
3	I-10	Fiber	3.2							
4	I-75	DMS		Mark IV	Trafficon	None	None	(24) Serial Over Fiber and (9) Dial-Up	None	None
4	I-95	DMS		Mark IV						
4	I-95	VIDS		Trafficon						
4	I-95	Fiber	30.447							
4	I-595	DMS		Mark IV						
4	I-595	VIDS		Trafficon						

District	Facility	Device Type	No. of Devices	Device Manufacturer	Detector Controllers	Video Switch	CODECS	Serial Data Transmission Format	Video Transmission Format	Video Distribution Format at TMC
4	I-595	Fiber	6.214							
5	I-4	CCTV	53	Sanyo, American Dynamics						
5	I-4	DMS	24	Vultron						
5	I-4	Fiber	65.606							
5	I-4	HUB	5							
5	I-4	LD	70							
5	I-95	CCTV	8	Sanyo, American Dynamics	170	American Dynamics	None	T1 over fiber	Analog	Analog
5	I-95	DMS	2	Vultron						
5	SR 408	ETC	4							
5	SR 417	ETC	4							
5	SR 429	ETC	1							
5	SR 528	DMS	4							
5	SR 528	ETC	2							
6	I-95	CCTV	27	Hitachi					Digital	Analog
6	I-95	DMS	6	Dambach/Vultron						
6	I-95	Fiber	17.5	SIECOR/altos(sm 96)				Serial over fiber		
6	I-95	HUB	2	A to Z Precast Concrete Soultions		Cornet	Cornet-MPEG2	Serial over fiber/Spread spectrum radio		
6	I-95	LD	3		170 E					
6	I-95	VIDS	51	Iteris	170 E					
6	NW 159 St	CCTV	1	Hitachi						
6	SR 826	CCTV	3	Sanyo		AD	Enerdyne	Serial over leased T1		
6	SR 826	DMS	3	Vultron				Serial over CCTV's T1		
6	SR 860	CCTV	1	Hitachi						

District	Facility	Device Type	No. of Devices	Device Manufacturer	Detector Controllers	Video Switch	CODECS	Serial Data Transmission Format	Video Transmission Format	Video Distribution Format at TMC
6	SR 860	DMS	2	Dambach						
6	SR 9	CCTV	1	Sanyo		AD	Enerdyne	Serial over leased T1		
6	SR 9	DMS	1	Vultron				Spread spectrum radio		
6	SR 91	CCTV	1	Sanyo		AD	Enerdyne	Serial over leased T1		
6	SR 91	DMS	1	Vultron				Spread spectrum radio		
6	SR 915	DMS	1	Dambach						
6	SR 7	DMS	2	Vultron				Serial over CCTV's T1		
6	SR 7	CCTV	2	Sanyo		AD	Enerdyne	Serial over leased T1		
7	I-275	CCTV	16	Pelco(3) Vicon(13)		Cornet				
7	I-275	DMS	3	Vultron						
7	I-275	ETC	2							
7	I-275	Fiber	7.1							
7	I-275	Phone	24	Comarco Wireless						
8	HEFT	ETC	13		Undetermined	Nortel Network Switch	ImPath MPEG2	TCP Socket to Serial Port Ethernet over fiber	Video over IP Digital	IP Multi-cast IGMP
8	HEFT	DMS	2	Mark IV						
8	HEFT	CCTV	40	Cohu / Vicon / Phillips						
8	HEFT	VC	42							
8	HEFT	HAR	1							
8	S.Connector	ETC	3							

District	Facility	Device Type	No. of Devices	Device Manufacturer	Detector Controllers	Video Switch	CODECS	Serial Data Transmission Format	Video Transmission Format	Video Distribution Format at TMC
8	Sawgrass	ETC	10							
8	SR 112	ETC	1							
8	SR 417	ETC	4							
8	SR 836	ETC	1							
8	SR 874	ETC	1							
8	SR 91	ETC	29							
8	SR 91	Fiber	17.26							
8	SR 91	HAR	8							
8	SR 91	DMS	19	Mark IV						
8	SR 91	CCTV	20	Cohu / Vicon / Phillips						
8	SR 91	HUB	2							
8	SR 91	AL	4							
8	SR 91	VC	28							
8	SR 924	ETC	1							
8	SR-570	ETC	3							
8	SR-589	ETC	2							
8	SR-91	Fiber	56.919							
8	Suncoast	ETC	3							

EXHIBIT "B"

REQUIREMENTS SPECIFICATION

STATEWIDE

TRANSPORTATION MANAGEMENT CENTER
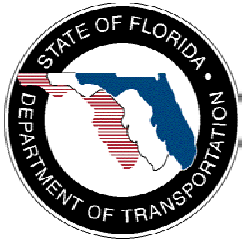
SOFTWARE LIBRARY SYSTEM

**Statewide Transportation Management Center
Software Library System:**

Requirements Specification

Prepared for:

Florida Department of Transportation
ITS Office
605 Suwannee Street, M.S. 90
Tallahassee, Florida 32399-0450
(850) 410-5600

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List of Acronyms

LAN .... Local Area Network
LCD .... Liquid Crystal Diode
LCS ....Lane Control Signal
LOS ....Level of Service
MIB... Management Information Base
MIST.. Management Information System for Transportation
MOU.. Memorandum of Understanding
MPH ....Miles Per Hour
MPO .... Metropolitan Planning Organization
MWRD.. Millimeter Wave Radar (Traffic) Detector
NTCIP ....National Transportation Communications for ITS Protocol
NITSA... *National ITS Architecture*
ODBC..Open Database Connectivity
OIS .... Office of Information Systems
PPMP ....Pulse Position Modulation Protocol
PTMC .... Portable Transportation Management Center
RAID.. Redundant Array of Independent (or Inexpensive) Disks
RCC ....Regional Communication Center
RTMC..Regional Transportation Management Center
RWIS... Road Weather Information System
SEOC ....State Emergency Operations Center
SITSA...*Statewide ITS Architecture*
SONET .... Synchronous Optical Network
SQL .... Structured Query Language
STMC .... Satellite (or Secondary) Transportation Management Center
STMP .... Simple Transportation Management Protocol
SwRI..Southwest Research Institute
TCP .... Transmission Control Protocol
TiRN™ .... Traveler Information Radio Network™
TMC ....Transportation Management Center
TranStat .... FDOT's Transportation Statistics Office
VIDS... Vehicle Image Detector System
VMS .... Variable Message Sign
VTMC... Virtual Transportation Management Center
WAN.. Wide Area Network
XML...Extensible Markup Language

1. Statewide Transportation Management Center Software Library System

It is the desire of the Florida Department of Transportation (FDOT) to acquire the most technically comprehensive advanced traffic management system (ATMS) software with government-owned source code and make it available throughout the State of Florida. The software must be flexible and expandable to match the individual needs of each regional transportation management center (RTMC). Each RTMC shall collect, assess, and manage real-time traffic data and video and deliver meaningful and accurate traffic management information to the motoring public and commercial vehicle operators. The primary goals of the Statewide Transportation Management Center Software Library System are to reduce congestion and delays while responding to traffic incidents in a rapid, accurate, and effective manner. The proposer shall be a software developer or integrator of TMC software of similar complexity defined in the Scope of Services and Requirements Specification.

1.1 Introduction

The FDOT has endorsed the concept of providing a centrally managed, publicly owned set of software modules to completely support all functionality of the RTMCs. This document specifies the system level functional requirements for software and hardware modules to be purchased or designed and programmed. It is FDOT's desire to purchase software that meets the functional requirements of this specification economically, avoiding custom software development wherever possible. Contract Vendors should propose equivalent functionality of their standard software products if they meet or exceed the requirement. In some cases, it may be more cost effective for FDOT to accept standard off-the-shelf software modules that do not completely meet the system requirements and, in other cases, FDOT may bear the cost of developing a custom solution for a critical functional requirement unique to Florida. There are software modules in the public domain that shall be evaluated by the Contract Vendor for their applicability to the Statewide Transportation Management Center Software Library System. States that may have software available include Georgia, Maryland, and Texas. The State of Florida is currently using four (4) transportation management center (TMC) software systems that are listed in Table 1.1.

**Table 1.1 – Existing Transportation Management Center (TMC)
Software Packages in Use**

	District 2	District 5	District 6	Turnpike District
Software	Navigator (JETSUN)	Management Information System for Transportation (MIST)	SunGuide^{SM} Florida's Intelligent Transportation System (ITS)	Navigator (SunNav)
Platform	Sun Solaris server Windows NT client	Windows NT 4.0 with Service Pack 6a	DEC Unix 4.0 server Windows NT client	Sun Solaris server Windows NT client
Database	Oracle (migrated from Sybase)	Sybase 11.9.2	Sybase 11.9.2	Sybase 12.5

1.1.1 Scope of the Statewide Transportation Management Center Software Library System

This document specifies both software and hardware system requirements that provide the TMC function. The Statewide Transportation Management Center Software Library System does not include the specification of field devices, the provision of physical communications links between field devices and the TMC, or the physical link between TMCs and FDOT. It does require that the software interface with such devices. Figure 1.1 depicts the external interface boundaries of the Statewide Transportation Management Center Software Library System that is being procured.

**Figure 1.1 – External Interface Boundary of the FDOT
Statewide Transportation Management Center Software Library System**
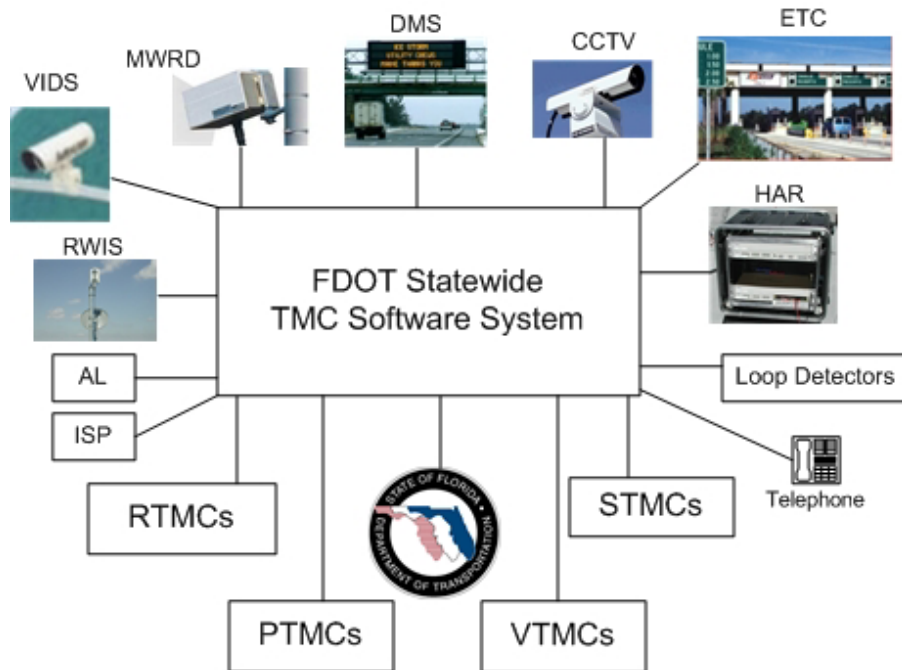
The general subsystems and components of the FDOT Statewide Transportation Management Center Software Library System that are specified herein are depicted in Figure 1.2. Two different views are shown – one from a physical perspective and the other from a software interface perspective.

Figure 1.2 – General Scope of the FDOT Statewide Transportation Management Center Software Library System
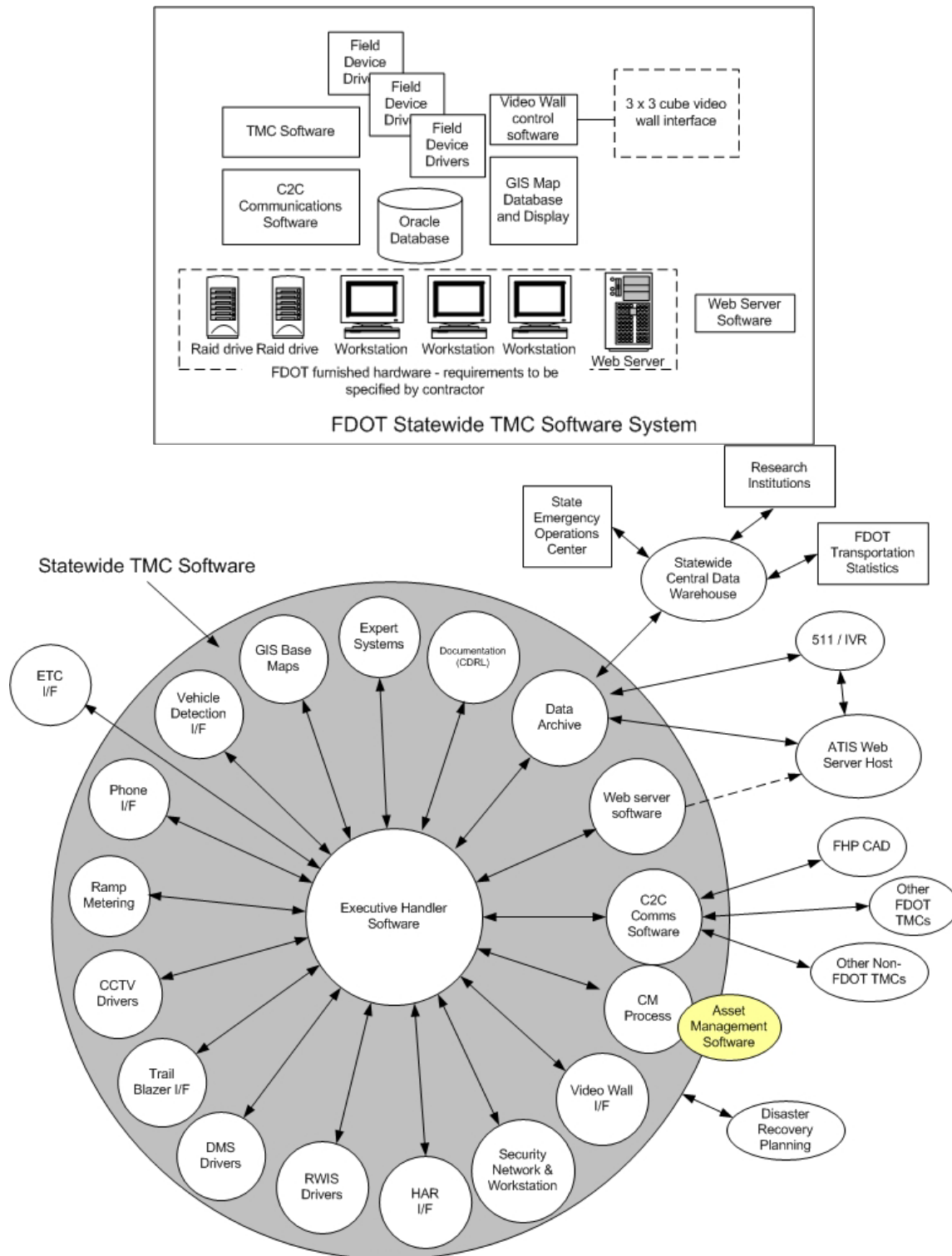
1.2 Transportation Management Center (TMC) Relationships

FDOT has identified four (4) types of TMCs that will connect to each other to provide data backup and temporary assumption of responsibilities in times of disaster. There are ten (10) RTMCs defined in *Technical Memorandum No. 4.1 – ITS Corridor Master Plans: Concept of Operations for ITS Deployments along Florida's Principal FIHS Limited-Access Corridors* (hereinafter referred to as the *ITS Concept of Operations* and available at http://floridaits.com) and each RTMC will connect to satellite (or secondary) transportation management centers (STMCs) and local TMCs, depending on the needs. Communications links between RTMCs are grouped by districts. There are eight (8) districts identified in the *Concept of Operations*
.

RTMCs will provide center-to-center communications between each other as shown in Table 1.2. The following information was extracted from the *Concept of Operations* dated May 8, 2002.

Table 1.2 – Regional Transportation Management Center (RTMC) Communications Links

FLORIDA REGIONAL TRAFFIC MANAGEMENT CENTERS	Broward County RTMC	Ft. Myers RTMC	Jacksonville RTMC	Miami RTMC	Orlando RTMC	Palm Beach County RTMC	Pompano Beach RTMC	Tallahassee RTMC	Tampa RTMC	Turkey Lake RTMC
Broward County RTMC		●		●		●	●			
Ft. Myers RTMC	●								●	
Jacksonville RTMC					●			●	●	
Miami RTMC	●						●			
Orlando RTMC			●			●			●	●
Palm Beach County RTMC	●				●		●			
Pompano Beach RTMC	●			●		●				●
Tallahassee RTMC			●							
Tampa RTMC		●	●		●					●
Turkey Lake RTMC					●		●		●	

The RTMC communications links for Districts 1 through 8's are shown in Tables 1.3 through 1.10, consecutively.

Table 1.3 – District 1's Regional Transportation Management Center (RTMC) Communications Links

DISTRICT 1 REGIONAL TRAFFIC MANAGEMENT CENTERS	Charlotte County TMC	City of Bradenton TMC	City of Cape Coral TMC	City of Ft. Myers TMC	City of Naples TMC	City of Sarasota TMC	City/County Police/Fire	Collier County TMC	Collier County TMC	County Emergency Management	FHP Troop F	Ft. Myers TMC	Lee County TMC	LEETRAN Transit Management Center	Manatee County TMC	MCAT Transit Management Center	Punta Gorda TMC	Road Rangers Service Patrol Dispatch	Sarasota County TMC	Sarasota STMC	SCAT Transit Management Center	SunPass Service Center
Charlotte County TMC												●					●					
City of Bradenton TMC															●							
City of Cape Coral TMC												●										
City of Ft. Myers TMC												●										
City of Naples TMC								●														
City of Sarasota TMC																				●		
City/County Police/Fire												●										
Collier County TMC					●							●										
Collier County TMC					● (red)							● (red)										
County Emergency Management												●										
FHP Troop F												●										
Ft. Myers TMC	●						●	●		●	●		●					●		●		●
Lee County TMC			●	●								●			●							
LEETRAN Transit Management Center												●										
Manatee County TMC		●														●				●		
MCAT Transit Management Center															●					●		
Punta Gorda TMC	●																					
Road Rangers Service Patrol Dispatch												●										
Sarasota County TMC						●														●	●	
Sarasota STMC												●			●	●			●		●	
SCAT Transit Management Center																			●	●		
SunPass Service Center												●										

Table 1.4 – District 2's Regional Transportation Management Center (RTMC) Communications Links

DISTRICT 2 REGIONAL TRAFFIC MANAGEMENT CENTERS	City of Gainesville TMC	City of Jacksonville TMC	City of Lake City TMC	City/County Fire and Police	Clay County TMC (For ATIS Only)	County Emergency Management	FHP Troop B	FHP Troop D	FHP Troop G	FHP Troop H	Gainsville Regional Transit Authority	Jacksonville RTMC	Jacksonville Transit Authority Transit Management Center	Lake City VTMC at District 2 Headquarters	St. Augustine TMC	St. Augustine TMC
City of Gainesville TMC												●				
City of Jacksonville TMC												●				
City of Lake City TMC												●				
City/County Fire and Police												●				
Clay County TMC (For ATIS Only)																
County Emergency Management												●				
FHP Troop B												●				
FHP Troop D												●				
FHP Troop G												●				
FHP Troop H												●				
Gainsville Regional Transit Authority												●				
Jacksonville RTMC	●	●	●	●		●	●	●	●	●	●		●	●	●	●
Jacksonville Transit Authority Transit Management Center												●				
Lake City VTMC at District 2 Headquarters												●				
St. Augustine TMC												●				
St. Augustine TMC												●				

Table 1.5 – District 3's Regional Transportation Management Center (RTMC) Communications Links

DISTRICT 3 REGIONAL TRAFFIC MANAGEMENT CENTERS	City of Pensacola TMC	City of Tallahassee Traffic Control Center	City/County Fire and Police	Escambia County Area Transit Agency	Escambia County TMC	Escambia/ Santa Rosa County Multimodal Transportation Operations Center	FHP Troop A	FHP Troop H	Leon County Emergency Management	Leon County TMC	Okaloosa County TMC	Panama City Traffic Center	Pensacola Satellite Traffic Operations Facility	Road Rangers Service Patrol	SEOC	Talahassee RTMC	TALTRAN Transit Control Center
City of Pensacola TMC					●												
City of Tallahassee Traffic Control Center									●							●	●
City/County Fire and Police																●	
Escambia County Area Transit Agency					●											●	
Escambia County TMC	●			●		●										●	
Escambia/ Santa Rosa County Multimodal Transportation Operations Center					●											●	
FHP Troop A																●	
FHP Troop H																●	
Leon County Emergency Management																	
Leon County TMC		●														●	
Okaloosa County TMC																●	
Panama City Traffic Center																●	
Pensacola Satellite Traffic Operations Facility																●	
Road Rangers Service Patrol																●	
SEOC																●	
Talahassee RTMC		●	●	●	●	●	●	●		●	●	●	●	●	●		
TALTRAN Transit Control Center		●															

Table 1.6 – District 4's Regional Transportation Management Center (RTMC) Communications Links

DISTRICT 4 REGIONAL TRAFFIC MANAGEMENT CENTERS	Broward County Emergency Management Center	Broward County ITS Operations Facility (RTMC)	Broward County Traffic Control Center	Broward County Transit Agency	City/County Police and Fire	County Emergency Management	FHP Troop K	FHP Troop L	Martin County Traffic Control Center	Palm Beach County Emergency Management Center	Palm Beach County ITS Operations Facility (RTMC)	Palm Beach County Traffic Control Center	Palm Beach County Transportation Authority	Pompano Beach Turnpike RTMC	Road Rangers Servive Patrol	St. Lucie County Traffic Control Center	SunGuide Smart Route TMC (For ATIS only)	SunPass Service Center	Tri-County Commuter Rail Authority
Broward County Emergency Management Center		●																	
Broward County ITS Operations Facility (RTMC)	●		●	●	●	●	●	●			●			●	●		●	●	
Broward County Traffic Control Center		●																	
Broward County Transit Agency		●																	
City/County Police and Fire		●																	
County Emergency Management		●																	
FHP Troop K		●																	
FHP Troop L		●																	
Martin County Traffic Control Center											●								
Palm Beach County Emergency Management Center																			
Palm Beach County ITS Operations Facility (RTMC)		●							●			●	●			●	●		●
Palm Beach County Traffic Control Center											●		●						
Palm Beach County Transportation Authority											●	●							
Pompano Beach Turnpike RTMC		●																	
Road Rangers Servive Patrol		●																	
St. Lucie County Traffic Control Center											●								
SunGuide Smart Route TMC (For ATIS only)		●									●								
SunPass Service Center		●																	
Tri-County Commuter Rail Authority											●								

Table 1.7 – District 5's Regional Transportation Management Center (RTMC) Communications Links

DISTRICT 5 REGIONAL TRAFFIC MANAGEMENT CENTERS	Brevard County Traffic Operations Center	Central Florida Regional Transportation Authority (LYNX) Transit Management Center	City of Datona Beach TMC (DASH)	City of Melbourne TMC	City of Ocala TMC	City of Orlando Traffic Operations Center	City/County Fire and Police	County Emergency Management	Disney/Reedy Creek TMC	District 1 Bartow VTMC	FDOT District 5 Headquarters STMC	FHP Troop C	FHP Troop D	FHP Troop G	FHP Troop K	OOCEA Tolls Office TMC	Orange County TMC	Orlando RTMC	Road Rangers Service Patrol	Seminole County Traffic Action Center	Space Coast Area Transit Agency	SunPass Service Center	Turkey Lake Turnpike RTMC	UCF Data Warehouse	Volusia County TMC	Volusia County Transit Agency (VOTRAN)	Volusia County EOC	Winter Park Traffic Operations Center
Brevard County Traffic Operations Center				●														●			●							
Transit Management Center																		●										
City of Datona Beach TMC (DASH)																		●										
City of Melbourne TMC	●																											
City of Ocala TMC																		●										
City of Orlando Traffic Operations Center										●						●		●										
City/County Fire and Police																		●										
County Emergency Management																		●										
Disney/Reedy Creek TMC																		●										
District 1 Bartow VTMC																		●										
FDOT District 5 Headquarters STMC						●										●		●		●					●	●		●
FHP Troop C																		●										
FHP Troop D																		●										
FHP Troop G																		●										
FHP Troop K																		●										
OOCEA Tolls Office TMC																		●										
Orange County TMC						●				●								●										●
Orlando RTMC	●	●	●		●		●	●	●	●	●	●	●	●	●	●			●	●	●	●	●	●	●	●		
Road Rangers Service Patrol																		●										
Seminole County Traffic Action Center										●								●										
Space Coast Area Transit Agency	●																	●										
SunPass Service Center																		●										
Turkey Lake Turnpike RTMC																		●										
UCF Data Warehouse						●												●										
Volusia County TMC						●												●								●		
Volusia County Transit Agency (VOTRAN)						●												●							●			
Volusia County EOC						●																						
Winter Park Traffic Operations Center																●												

Table 1.8 – District 6's Regional Transportation Management Center (RTMC) Communications Links

DISTRICT 6 REGIONAL TRAFFIC MANAGEMENT CENTERS	City/County Fire and Police	County Emergency Management	FHP Troop E	FHP Troop K	Miami RTMC	Miami-Dade County Traffic Control Center	Miami-Dade Expressway Authority (MDX) TMC	Miami-Dade Transit Authority (MDTA)	Pompano Beach RTMC	Road Rangers Service Patrol	SunGuide Smart Route TMC (For ATIS Only)	Sunpass Service Center	Tri-County Commuter Rail Authority (Tri-Rail)
City/County Fire and Police					●								
County Emergency Management					●		●						
FHP Troop E					●								
FHP Troop K					●								
Miami RTMC	●	●	●	●		●		●	●	●	●	●	●
Miami-Dade County Traffic Control Center					●		●	●					
Miami-Dade Expressway Authority (MDX) TMC		●			●	●		●			●		
Miami-Dade Transit Authority (MDTA)					●	●	●						
Pompano Beach RTMC					●								
Road Rangers Service Patrol					●								
SunGuide Smart Route TMC (For ATIS Only)					●		●						
Sunpass Service Center					●								
Tri-County Commuter Rail Authority (Tri-Rail)					●								

Table 1.9 – District 7's Regional Transportation Management Center (RTMC) Communications Links

DISTRICT 7 REGIONAL TRAFFIC MANAGEMENT CENTERS	City of Clearwater TMC	City of Lakeland TMC	City of Tampa Traffic Control Center	City/County Fire and Police	County Emergency Management	District 1 Bartow VTMC	FHP Troop C	FHP Troop F	Future SunGuide ISP Center	Future THCEA Management Center	HARTLine Transit Control Center	Hernando County Traffic Control Center	Hillsborough County Traffic Control Center	Manatee County Traffic Control Center	Pasco County Traffic Control Center	Pinellas County TMC	Pinellas Suncoast Transit Authority (PSTA)	Plant City Traffic Control Center	Road Rangers Service Patrol	St. Petersburg Traffic Control Center	SunPass Service Center	Sunshine Skyway North Toll Plaza Control Center	Tampa RTMC	Turkey Lake Turnpike RTMC
City of Clearwater TMC																●								
City of Lakeland TMC																							●	
City of Tampa Traffic Control Center													●											
City/County Fire and Police																							●	
County Emergency Management																							●	
District 1 Bartow VTMC																							●	
FHP Troop C																							●	
FHP Troop F																							●	
Future SunGuide ISP Center																							●	
Future THCEA Management Center																							●	
HARTLine Transit Control Center																●								
Hernando County Traffic Control Center																							●	
Hillsborough County Traffic Control Center		●								●								●					●	
Manatee County Traffic Control Center																							●	
Pasco County Traffic Control Center																							●	
Pinellas County TMC	●																●			●			●	
Pinellas Suncoast Transit Authority (PSTA)																●							●	
Plant City Traffic Control Center													●											
Road Rangers Service Patrol																							●	
St. Petersburg Traffic Control Center																●								
SunPass Service Center																							●	
Sunshine Skyway North Toll Plaza Control Center																							●	
Tampa RTMC		●	●	●	●	●	●	●	●			●	●	●	●	●	●		●		●	●		●
Turkey Lake Turnpike RTMC																							●	

Table 1.10 – Florida's Turnpike Enterprise Regional Transportation Management Center (RTMC) Communications Links

DISTRICT 8 REGIONAL TRAFFIC MANAGEMENT CENTERS	District 2 Jacksonville RTMC	District 4 Broward County RTMC	District 4 Palm Beach County RTMC	District 5 Orlando RTMC	District 6 Miami RTMC	District 7 RTMC	FHP Troop C	FHP Troop D	FHP Troop K	Pompano Beach ITS Operations Facility (RTMC)	Road Rangers Service Patrol	SunGuide Smart Route TMC (For ATIS Only)	SunPass Service Center	Turkey Lake ITS Operations Facility (RTMC)
District 2 Jacksonville RTMC														●
District 4 Broward County RTMC										●				
District 4 Palm Beach County RTMC										●				
District 5 Orlando RTMC														●
District 6 Miami RTMC										●				
District 7 RTMC														●
FHP Troop C										●				●
FHP Troop D										●				●
FHP Troop K										●				●
Pompano Beach ITS Operations Facility (RTMC)		●	●		●		●	●	●		●	●	●	
Road Rangers Service Patrol										●				●
SunGuide Smart Route TMC (For ATIS Only)										●				●
SunPass Service Center										●				●
Turkey Lake ITS Operations Facility (RTMC)	●			●		●	●	●	●	●	●	●	●	

2.   Concept of Operations

FDOT intends to acquire or develop a software library system for ATMS applications to be used statewide at TMCs that initially will manage traffic along the State's ITS corridors. The *ITS Concept of Operations* has been published and includes a section on the integration and operation of TMCs throughout the State. This section states the vision for such a software system and serves as the foundation for further development of the concept and, later, the requirements for such a software system. The initial implementation of the Statewide Transportation Management Center Software Library System will be for the management of Florida's limited access facilities. The implementation will be for software that supports coordination with surface street traffic, including traffic signal coordination, highway-rail coordinated operations, detour sign control, and Turnpike Enterprise toll system traffic statistics.

2.1   Software Architecture Concept

The central element of ITS operations is the TMC. A future conceptual RTMC/TMC classification strategy and coverage was developed for the ITS deployments that coincides with programmed changes in the law enforcement dispatch operations and boundaries. These proposed RTMC dispatch collocations and coverages were recommended to increase efficiency and cost-effectiveness and to coordinate deployments, development, and maintenance of the Statewide ITS programs.

The *ITS Corridor Master Plans* identified five (5) ITS corridors in the State as follows:

- Interstate 4 (I-4);
- Interstate 10 (I-10);
- Interstate 75 (I-75);
- Interstate 95 (I-95); and
- Florida's Turnpike.

Florida's ITS services are rapidly emerging on the Florida Intrastate Highway System's (FIHS) limited-access facilities and are the initial target for deployment of a Statewide Transportation Management Center Software Library System. The *ITS Concept of Operations* has identified four (4) types of TMCs as follows:

- RTMCs;
- STMCs;
- Virtual transportation management centers (VTMCs); and
- Portable transportation management centers (PTMCs).

The concept is for the RTMC to serve as the hub for command and control decisions for operations along the intrastate corridors. It will coordinate with other operational stakeholder agencies and transportation control centers as necessary. Secondary and virtual TMCs will be capable of fulfilling the RTMC responsibilities when required for limited durations when secondary control is required due to man-made or natural disasters or maintenance activities that require the primary center to be off-line.

The software architecture that supports this concept is database centric. All processes receive and send data through the database. The most recent data is contained in the database, so when data is needed, it is retrieved from the database. Likewise, when an acquisition process receives roadside data from field devices, the data will be transferred to the database immediately. In this concept of database centric design, a process will not communicate directly with a field device.

The software needed to support the TMC concept is referred to as the Statewide Transportation Management Center Software Library System and will allow the regional and local TMCs to employ only the software they need based on their responsibilities and their surveillance equipment capabilities. The Statewide Transportation Management Center Software Library System will consist of a basic set of software modules needed for operator interface, National Transportation Communications for ITS Protocol (NTCIP)-compliant center-to-center communications (referred to as a shell), and specific traffic management modules. The software will be tailored for the available surveillance and communications devices along the limited-access facilities as shown in Figure 2.1.

**Figure 2.1 – Statewide Transportation Management Center
Software Library System's Operational Concept**
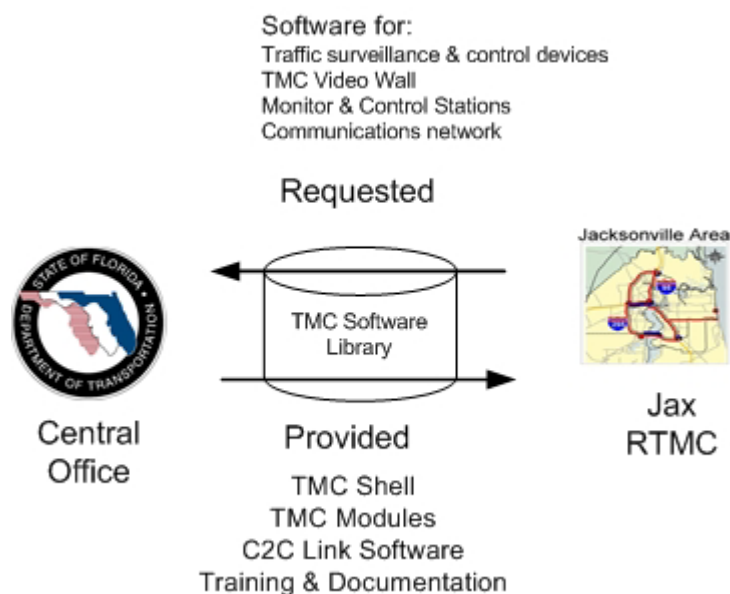
The Statewide Transportation Management Center Software Library System integrator will provide training and documentation that includes: change management (configuration management), operator training, and software training support. At a minimum, the documentation will include a user's manual, software documentation, an administrator's manual, and change management information. Every TMC software shell will have basic center-to-center communications following NCTIP standards tailored to Florida's requirements. When the software is installed and activated, it will establish a link with the main TMC software database located centrally in the State and download any upgrades to the modules or any special configuration parameters. This process is modeled conceptually after the way many commercial software packages work. When a software application loads, it will connect to the FDOT network where it will check for any recent upgrades to the software and will also register a new user in the database.

The design and specification of Center-to-Center (C2C) communications will be accomplished through a separate contract with the Florida Telecommunications General Consultant (TGC). The interface between the TMC software and the C2C software is subject to technical discussions between the STMCSLS contractor and the TGC, however it is intended that C2C communications be provided or acquired software drivers by TGC and to be used by the TMC software when needed. The STMCSLS contractor shall provide plug-in for C2C communications. An interface control document will be developed to manage the Center-to-Center interface. The TGC and the STMCSLS contractor will jointly develop this interface and its documentation.

The graphical user interface (GUI) will be tailored to the ITS capabilities of the TMC application. Controls or options for functions that are not installed will not be included in the interface. There will be a software wizard that will help establish a physical connection to the hardware devices in the field from the TMC software with some basic self-test software to verify operational capabilities. As a TMC's needs grow, additional modules can be downloaded as needed and as requested. If the TMC purchases a new ITS device that is new to the market and FDOT wants to adopt it, a local TMC site manager will only need to download a new module or even an update of a previous module.

Interfaces between the device specific software and the TMC software shell will be standardized so if a device changes, only the module will need updating and not the software shell itself. Figure 2.2 is a high-level diagram of the architecture that supports this concept. In Section 3, the requirements section, more detailed diagrams are presented.

Figure 2.2 – Statewide Transportation Management Center Software Library System's Conceptual Architecture
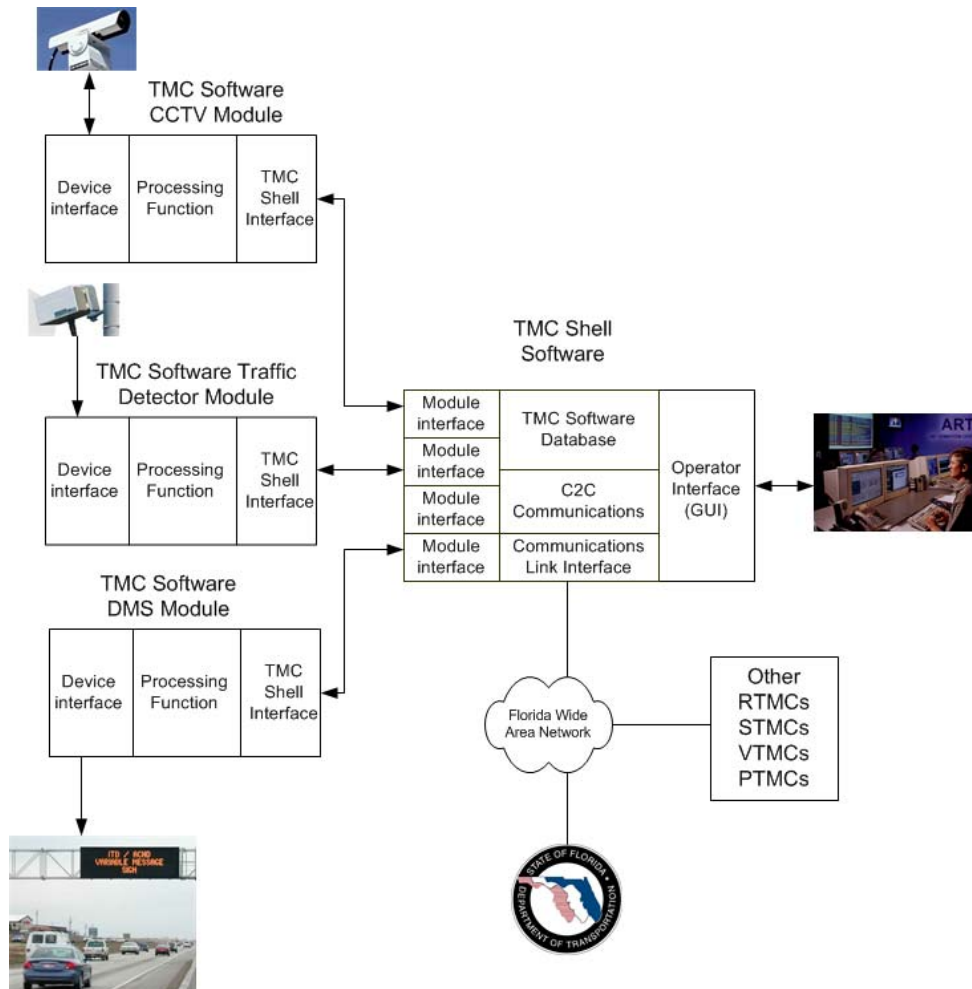
2.14.1 Network Security

The FDOT Statewide Transportation Management Software Library System must provide network security, preferably through a hardware/software firewall. A firewall should be selected that provides Evaluation Assurance Level 4 (EAL-4+) certification and should employ a "default deny" security policy. Both American Standard Code for Information Interchange (ASCII) and binary logging should be available and enabled.

Careful consideration should be given to the number of ports available on the selected firewall appliance hardware. A multi-layer demilitarized zone (DMZ) model is recommended to segment traffic coming into the transaction server(s) from being able to access the database layer with public local area network (LAN) connections (if any). In a typical data security architecture, where external devices are connected to the ITS data center by a public LAN, the external firewall allows access to servers in the transaction layer but only on selected ports dedicated to connections with specific external devices. All other ports are blocked. The internal firewall, which may be the physically-identical firewall appliance, provided enough ports are available, permits access to the database layer only from the IP address of the transaction server. This firewall permits access only over the specified ports dedicated to the database listener.

Internally, application servers are connected over the same LAN as the database servers. The ITS LAN is connected to other FDOT LANs via a router or routers that connect over the private FDOT network.

2.2   Implementation

The FDOT District 4 Broward County RTMC and District 6 Miami RTMC will be the sites of pilot deployment of the Statewide Transportation Management Center Software Library System, pending on the resolution of the development of Memorandum of Understanding (MOU) between FDOT District 4, FDOT District 6 and the ITS Office. Based on the lessons learned integrating the software at the FDOT District 4 Broward County RTMC and District 6 Miami RTMC the software will be baseline and available for statewide deployment.

The FDOT District 4 Broward County RTMC and District 6 Miami RTMC will be the first recipients of a fully tested TMC software package that has been accepted by FDOT. It must be emphasized that the FDOT District 4 Broward County RTMC and District 6 Miami RTMC will not be test beds for integration, testing, and debugging of the software.

A systems integration process will be followed that will verify that desired TMC functions meet their requirements and a thorough software final acceptance test will be conducted to formally accept the software after it completes integration testing.

2.2.1   Integration Concept

FDOT will define functional capabilities that must be demonstrated as part of the phased integration approach. These functional capabilities are achieved by stringing software modules together that accomplish the desired functionality. For example, the function of traffic surveillance through a closed-circuit television (CCTV) will require a basic operator interface to be provided along with the module that communicates with the CCTV

camera. With these software components, surveillance of a portion of the limited-access facility can be demonstrated.

Functional capabilities (called functional threads) using similar software modules will be grouped into an integration case for purposes of integration testing and demonstration. FDOT and the TMC software developer will mutually agree upon the number of integration cases that can represent software builds that accommodate a phased deployment of the software. Each integration case will culminate in a milestone demonstration of the required functionality.

By following a phased integration and building on a foundation of previously tested software with demonstrated functionality, FDOT will reduce the risk in software development and the final Statewide Transportation Management Center Software Library System will be more robust from having been thoroughly tested.

2.3   Requirements Management

All system level requirements are uniquely identified by a letter-number code. Requirements starting with the letter "A" represent FDOT needs and are extracted from Section 8 of the *ITS Concept of Operations* dated May 8, 2002. The letter "S" identifies software system requirements and each subsystem in the software design has two letter identifiers that denote its function such as "DB" for database. Components of the subsystems have a letter suffix added to the subsystem identification, such as the abstraction layer function of the database that is DBxxxA, where xxx is a number.

2.4   Operational Requirements

Operational requirements are considered to be stakeholder requirements that are referred to as user requirements. All system requirements must connect to a user requirement for the TMC software system design to be valid. The following are the user requirements extracted from the *ITS Concept of Operations*:

- A001 The TMC software shall provide software for incident detection along the limited-access facilities.

- A002 The TMC software shall provide software for video surveillance along the limited-access facilities and the interchange areas (along the mainline and crossroads).

- A003 The TMC software shall provide for the management and operations of limited-access facilities during incident management and peak demand periods

and one-way operations during evacuations including control of detour signage.

- A004   The TMC software shall provide software for the collection and dissemination of traveler information using dynamic message signs (DMS), trail blazer signs, highway advisory radio (HAR), and advanced traveler information system (ATIS) services (511 telephone services, Internet, commercial radio, television, text messaging, etc.) for freeway operations and where available along other arterial routes independently or through an information service provider (ISP) contract vendor for ATIS.

- A005   The TMC software shall provide software for detection of road weather conditions that may impact operations.

- A006   The TMC software shall provide software for the identification of construction work zones and activities to support operations and management of these work zones and, where smart work zone management is provided, integration of the smart work zone management into freeway management systems (FMS) and incident management systems (IMS).

- A007   The TMC software shall provide software for traffic data collection and support incident detection.

- A008   The TMC software shall provide software for real-time video display and real-time video control.

- A009   The TMC software shall provide software for video verification of messages posted on DMS.

- A010   The TMC software shall provide software for incident data archiving.

- A011   The TMC software shall provide software for coordination with all law enforcement, fire/rescue, and emergency management personnel, coordination with local traffic operation centers, and coordination with county emergency management centers and the State Emergency Operations Center (SEOC) when appropriate.

- A012   The TMC software shall provide software for the management, dispatch, and coordination of Road Rangers Service Patrols.

- A013   The TMC software shall provide system maintenance and management of ITS field devices and communications infrastructures and a plan to ensure responsive and preventative maintenance is being carried out through an

interface (upload/download) to a bar code reader for the tracking of equipment, devices, and locations and link to central database information.

- A014 Configuration management of traffic management software shall be provided by the operating TMC until the Statewide Transportation Management Center Software Library System is available. (Configuration management will then occur at a statewide level). This software will include device drivers, GUIs, operating systems, databases, and other commercial off-the-shelf software needed to operate and manage the TMC.

- A015 The TMC software shall provide software for coordination with a freeway incident management team involving major stakeholders.

- A016 The TMC software shall provide software for management and operations in support of the motorist aid call box system.

- A017 The TMC software shall provide for the reporting of data needed for performance monitoring and deployment evaluation including highway performance monitoring system (HPMS) requirements through coordination with FDOT's Transportation Statistics (TranStat) Office.

- A018 The TMC software shall provide software for traffic and delay prediction to support incident management and performance monitoring (including travel times and travel speeds).

- A019 The TMC software shall provide software for traffic data archiving and data warehousing including regional data sharing capabilities.

- A020 The TMC software shall provide software for center-to-center communications to support major incidents that affect multiple jurisdictions including evacuation.

- A021 The TMC software shall support the coordination and delegation of control of operations and management during natural or man-made disasters or evacuations.

- A022 The TMC software shall provide software for the maintenance of a list of diversion routes for management of traffic during incidents and evacuations. The software shall tie in with construction updates to avoid detours into construction areas.

- A023 The TMC software shall provide software for the management of lane or road closures during natural or man-made disasters or evacuations and integration with computer-aided dispatch (CAD) systems for incident detection with

regional communications centers (RCCs) and emergency operations centers (EOCs) through co-location, communications links, and software or the provision of operations stations in the TMC.

- A024 RTMCs shall have primary responsibility for managing traffic along the State freeway system.

- A025 Secondary and virtual TMCs shall be capable of fulfilling the RTMC responsibilities when required for limited-durations when secondary control is required.

- A026 In major urban areas, TMC services shall be provided 24 hours a day, 7 days a week [Level of Service (LOS) 5].

- A027 In non-major urban areas, TMC services shall be provided 16 hours per day (LOS 4).

- A028 The TMC software shall be designed to accommodate future capabilities to include:
    o Identification of incident locations identified through cell phones using Enhanced 911 (E-911) services;
    o Reverse 911 or 511 services to advise travelers of urgent advisories related to emergencies or road closures;
    o Identification of vehicle travel times and delays using probe vehicle technologies that may include **SunPass**® transponders or automatic vehicle location (AVL) technologies on transit, police, emergency vehicles, or cell phone technologies; and
    o Interface to and control of detour signage (i.e., trail blazer signs).

- A029 There shall be four categories of TMCs in Florida that relate to their responsibility in managing traffic as follows:
    o RTMCs;
    o STMCs;
    o VTMCs; and
    o PTMCs.

- A030 The RTMC shall serve as the hub for command and control decisions for operations along the intrastate corridors and will coordinate with other operational stakeholder agencies and transportation control centers as necessary.

- A031 The PTMC shall support work zone management or special traffic management scenarios and use wireless data links to a STMC or VTMC to access and store local data.

2.5 Transportation Management Center (TMC) Software Functions Summary

The following sections describe the subsystems and associated data elements that FDOT considers a part of its statewide operational concept. A description of the subsystem and its data elements are provided. *National ITS Architecture (NITSA)* user service requirements will be linked to the subsystems as appropriate.

2.5.1 Incident Management Subsystem

An incident management subsystem manages both predicted and unexpected incidents so that the impact to traveler safety on the transportation network is minimized. Incidents such as accidents, roadwork and lane closures, and special events are all managed by the incident management subsystem. Information is collected from roadway sensors, external incident reports, and construction and maintenance agencies, as well as event promoters, to detect and verify incidents. A variety of field equipment such as DMS, trail blazer signs, CCTV, lane control signals (LCS), HAR, and traffic signals are used to coordinate a response to the incident. Coordination with emergency management agencies is provided through notification of current traffic conditions and the use of traffic images, as well as the control of traffic signals for the purposes of gaining right-of-way. Incident information is also provided to the media for broadcasting to the public. The following data elements were identified for use in the Statewide Transportation Management Center Software Library System by the *Introduction to an Operational Concept for the Florida Statewide Library*:

- Traffic images;
- Closure coordination;
- Work zone status;
- Event plans;
- Logged special vehicle route;
- External reports;
- Traffic information;
- Weather information;
- Incident information report;
- Incident information;
- Incident data;
- Incident response status;
- Emergency traffic control request and response;
- Remote surveillance control;
- Resource request;
- Resource deployment status;

- Maintenance resource request;
- Hazardous materials (HAZMAT) information; and
- Media information.

2.5.2   Closed-Circuit Television (CCTV) Subsystem

The CCTV subsystem provides the traffic images that are obtained from cameras mounted on the freeway and surface streets. The subsystem allows users to view live video, control the camera (i.e., pan, tilt, zoom), switch camera displays, obtain status for the camera, and capture still frames. This subsystem assists operators in detecting incidents and monitoring traffic conditions. The following data elements were identified *Operational Concept Document* for use in the CCTV subsystem:

- Traffic images; and
- CCTV control parameters and record.

2.5.3   Dynamic Message Sign (DMS) Subsystem

A DMS subsystem provides the functionality to retrieve the status of DMSs as well as configure and control the signs. A DMS subsystem may be used to display incident information, travel times, and other informational messages on DMSs. The following data elements were identified in the *Operational Concept Document* for use in the DMS subsystem.

- Traffic operator inputs;
- Roadway information system status; and
- Roadway information system data.

2.5.4   Archived Data Management Subsystem

Archived data management refers to the storage of data that is collected and owned by a single agency, as well as the functionality and interfaces needed to collect data from multiple agencies and data sources. Archived data management subsystems also provide the means to perform data transformation so that all the data is stored in a consistent format. Basic query and reporting features are offered as well as on-line analysis and central data warehousing features. An ITS data warehouse, which is physically located on a single machine, may be used for archived data management or a virtual ITS data warehouse. The data is physically distributed among various ITS archives that are each locally managed. Archived data management may take place at the district level within the various TMCs and/or at a higher, statewide level. For each of the data items below, the content of the data may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information:

- Commercial vehicle archive data;
- Construction and maintenance archive data;
- Emergency archive data;
- Traveler archive data;
- Parking archive data;
- Roadside archive data;
- Traffic archive data;
- Weather information data; and
- Travel time and delay archive data.

2.5.5   Traveler Information Subsystem

A traveler information subsystem is involved in the collection of data such as current traffic conditions, advisories, incident information, air quality, and weather information. This information is disseminated to the driving public via radio broadcasts, roadway equipment (i.e., DMSs and HARs), webservers, and personal devices (i.e., pagers, cellular phones, and laptops). A traveler information subsystem also provides interactive systems that allow the traveling public to select routes that take personal preferences, traffic conditions, and incident information into account. An ISP is at the core of a traveler information subsystem. The ISP performs the major functions of collecting traffic, incident, and weather information, processing and storing the data, and then disseminating this information to interested parties. The FDOT Statewide Public Information System serves as an ISP in Florida. The following data elements were identified in the *Introduction to an Operational Concept for the Florida Statewide Library* for use in the traveler information subsystem:

- Request for traffic information;
- Media information request;
- Traffic information;
- Traffic information for media;
- Trip planning;
- Broadcast advisories;
- Roadway information system status;
- Incident information;
- Weather information;
- Traveler information;
- Selected routes;
- Parking information; and
- Parking lot data request.

2.5.6 Center-to-Center Communications Infrastructure

A center-to-center communications infrastructure allows the exchange of data between several differing ITS services within various TMCs. By using the same ITS standards to communicate through the center-to-center infrastructure, differing ITS services are able to receive status information from other systems and send commands to remotely configure and control equipment. The following data elements were identified in the *Introduction to an Operational Concept for the Florida Statewide Library* for center-to-center communications:

- Traffic information coordination;
- Traffic control coordination;
- Traffic images roadway information system status;
- Roadway information system data;
- Traffic operator inputs;
- Incident information;
- Weather information;
- Traffic flow;
- Traffic characteristics;
- Reversible lane status;
- Sensor and surveillance control;
- Freeway control status;
- Freeway control data;
- High occupancy vehicle (HOV) data;
- Event planning;
- Trip planning;
- Logged special vehicle route;
- Fault reports.

2.5.7 Ramp Meter Subsystem

The ramp meter subsystem provides the capability to manage traffic flow on freeway ramps. The subsystem is designed to time the entrance of vehicles from access onto the freeway mainlanes. Ramp meters allow merging vehicles to enter the freeway smoothly and therefore lessen congestion on the entrance ramp. The subsystem controls ramp meters located on freeway ramps by providing a series of traffic flow patterns that can be executed by the ramp meter. The subsystem also selects a default traffic flow pattern, but may override the default pattern by commanding the ramp meter to use one of the other alternative patterns. The subsystem may also request status from the ramp meters. The following data elements were identified in the Introduction to an Operational Concept for the Florida Statewide Library for use in the ramp meter subsystem:

- Freeway control status;
- Freeway control data;
- Traffic flow; and
- Traffic characteristics.

2.5.8 Detection Subsystem

A detection subsystem consists of the software systems that are used to monitor and record readings from field equipment such as roadway loops and video image vehicle detection systems. The readings taken from a detection subsystem are used to track traffic conditions and identify potential incidents. The data collected may also be used to plan future traffic control strategies. The following data elements were identified in the *Introduction to an Operational Concept for the Florida Statewide Library* for use in the detection subsystem:

- Raw detector data;
- Traffic images;
- Traffic flow;
- Traffic characteristics;
- Reversible lane status;
- Weather condition; and
- Environmental conditions.

2.5.9 Highway Advisory Radio (HAR) Subsystem

The HAR subsystem is designed to provide advisories to motorists by broadcasting verbal messages on designated radio stations or text messages to personal devices such as pagers and cell phones. The subsystem can send messages to the HAR subsystem and retrieve status from the HAR subsystem. The following data element was identified for use in the *Introduction to an Operational Concept for the Florida Statewide Library* for use in the HAR subsystem:

- Broadcast advisories.

2.5.10 Traffic Signals Subsystem

The traffic signals subsystem manages traffic signals located on surface streets. The subsystem can download new or updated timing patterns to the traffic signal subsystem as well as alter the current pattern for a short duration for special events. There will be no arterial traffic signal control for the RTMCs and hence there are no requirements to handle traffic signal timing and preemption. Functions of interface and information sharing between FDOT and local TMCs will be considered if interface definitions for software requirements and configuration management are needed in the future.

2.5.11 Toll Collection Subsystem

A toll collection subsystem is comprised of the equipment and software systems that allow the collection of tolls electronically. Communications between TMCs and the toll collection subsystem are not a part of the TMC system because the toll facilities are in a different system under Florida's Turnpike Enterprise. Software used to operate and manage the **SunPass**® electronic toll system is operated and maintained by the Florida's Turnpike Enterprise.

2.5.12 Traffic Planning Subsystem

A traffic planning subsystem includes advanced algorithms, processing, and mass storage capabilities that support historical evaluation, real-time assessment, and forecast of the roadway network performance. Through the collection and evaluation of traffic data, a traffic planning subsystem may better predict travel demand patterns, derive more accurate travel time forecasts, and support demand management requests made to toll administrations and parking facilities. The data provided by a traffic planning subsystem can also be used to support "the implementation of travel demand management programs and policies managing both traffic and the environment. Information on vehicle pollution levels, parking availability, usage levels, and vehicle occupancy are collected by monitoring sensors to support these functions. The following data elements have been identified in the *Introduction to an Operational Concept for the Florida Statewide Library* for use in the traffic planning subsystem:

- Traffic information;
- Traffic flow;
- Event planning;
- Trip planning;
- Road network use; and
- Logged special vehicle route.

2.5.13 Detour Sign Control

A TMC should be able to control detour signs (also known as trail blazer signs) on predetermined arterial routes for traffic diversion from interstates to arterials and then back to interstates. Additionally, CCTVs should be provided for arterial surveillance along these routes.

2.5.14 Commercial Vehicle Operations (CVO)

Systems that support the management of commercial vehicle operations (CVO) provide the functionality to electronically clear commercial vehicles traveling at highway speeds. As commercial vehicles pass roadside check facilities, carrier, vehicle, and driver information is transmitted, enabling electronic clearance, automatic payment of fees, and the identification of violators. This also allows for easy tracking of commercial vehicles and the routes that are used. Screening for compliance with safety and weight restrictions can also be automated in this way. The following functions and information have been identified in the *Introduction to an Operational Concept for the Florida Statewide Library* for use in CVO:

- Lane restrictions; and
- HAZMAT management.

2.5.15 Evacuation Management

The TMC needs to exchange the information with evacuation management centers for better management of the evacuation process, evacuation routes, real-time traveler information, and coordination with the emergency management centers. Information is collected from roadway sensors, external incident reports, and construction and maintenance agencies, as well as event promoters, to detect and verify incidents. A variety of field equipment such as DMS, CCTV, lane control signals, HAR, and traffic signals are used to coordinate a response to evacuations during disasters. Coordination with emergency management agencies is provided through notification of current traffic conditions and the use of traffic images, as well as the control of traffic signals for the purpose of gaining right-of-way. Incident information is also provided to the media for broadcasting to the public. The following functions and information have been identified for use in evacuation management:

- Traffic images;
- Closure coordination;
- Traffic information;
- Weather information;
- Incident information report;
- Incident information;
- Incident data;
- Incident response status;
- Emergency traffic control request and response;
- Remote surveillance control;
- Resource request;
- Resource deployment status;
- Maintenance resource request;
- Media information;
- Evacuation information for management request and response; and
- Evacuation network status request and response.

2.5.16 Maintenance and Construction Management

The TMC needs to exchange information with maintenance and construction management agencies for better management of traffic operations, work zone safety enhancement, and lane closure information. Coordination with maintenance and construction management agencies is provided through notification of current traffic conditions and the use of traffic images, as well as the control of traffic signals for the purpose of gaining right-of-way. Incident information is also provided to the media for broadcast to the public. The following functions and information have been identified for use in maintenance and construction management:

- Traffic images;
- Closure coordination;
- Traffic information;
- Weather information;
- Work zone information;
- Roadway maintenance status;
- Maintenance and construction work plans request and response;
- Maintenance and construction resource request and response
- Incident information;
- Equipment maintenance status;
- Current asset restrictions;
- Road network conditions; and
- Field equipment status.

3.5.17   Miscellaneous

The following data elements have been identified as necessary functions and information in the *Operational Concept Document*, but the functions and information do not fit into the defined categories above:

- Parking demand management request and response;
- Parking instructions;
- Fault reports
- Traffic equipment status; and
- Equipment maintenance status.

3. Requirements

In the Statewide Transportation Management Center Software Library System architecture, all data and control information is inserted and retrieved from the database. Status data from external devices, sensors, and other data sources are also inserted into the database. All application interfaces display data based on the contents of the database and all data inserted in the application is inserted into the database. This database centric approach centralizes and normalizes all data required to operate the system and provides a consistent interface to access data.

- S001 The Statewide Transportation Management Center Software Library System shall provide for a centrally managed set of software modules that completely support all functionality of the RTMCs.

- S002 The Statewide Transportation Management Center Software Library System shall consist of public domain/public sector software (object and source code) wherever possible.

- S029 Before any software development begins, commercial off-the-shelf software and nonproprietary public-owned software that will be served as foundation of the TMC Software system shall be documented to establish a baseline for configuration management.

- S018 The Statewide Transportation Management Center Software Library System shall interface with FDOT legacy device drivers.

- S027 The FDOT Statewide Transportation Management Center Software Library System shall adhere to open architecture standards

In general, FDOT requires that the Windows NT or XP series of operating systems be used for workstations and that the relational database manager software be Oracle. It can be assumed that Fast Ethernet will provide LAN connections and the Transmission Control Protocol/Internet Protocol (TCP/IP) will be the protocol. ESRI ArcView and ArcInfo are the geographical information system standards. Figure 3.1 shows a sample diagram of how the Statewide Transportation Management Center Software Library System could be implemented. From the top of the diagram, external systems feed data into the TMC data center. However, these devices are from a variety of manufacturers and will likely respond to different control commands and return data in different formats. It is not known whether these external devices, sensors, or systems comply with industry standards, but the database should be standards compliant. Additionally, as similar devices from different manufacturers will, for the most part, perform similar functions, it would simplify management of these devices if the control and data formats of these various components could be referred to by a consistent internal format across devices.

- S003 The Statewide Transportation Management Center Software Library System shall use a centric database architecture where all functions insert and retrieve data from a central database.

- S004 The Statewide Transportation Management Center Software Library System shall be flexible and expandable to match the individual needs of each RTMC.

- S005 Each RTMC shall collect, assess, and manage real-time traffic data and video and deliver meaningful and accurate traffic management information to the motoring public and commercial vehicle operators.

- S006 The Statewide Transportation Management Center Software Library System shall provide each TMC with the software tools that can be used to reduce congestion and delays while responding to traffic incidents in a rapid, accurate, and effective manner.

Figure 3.1 – Sample Software Architecture
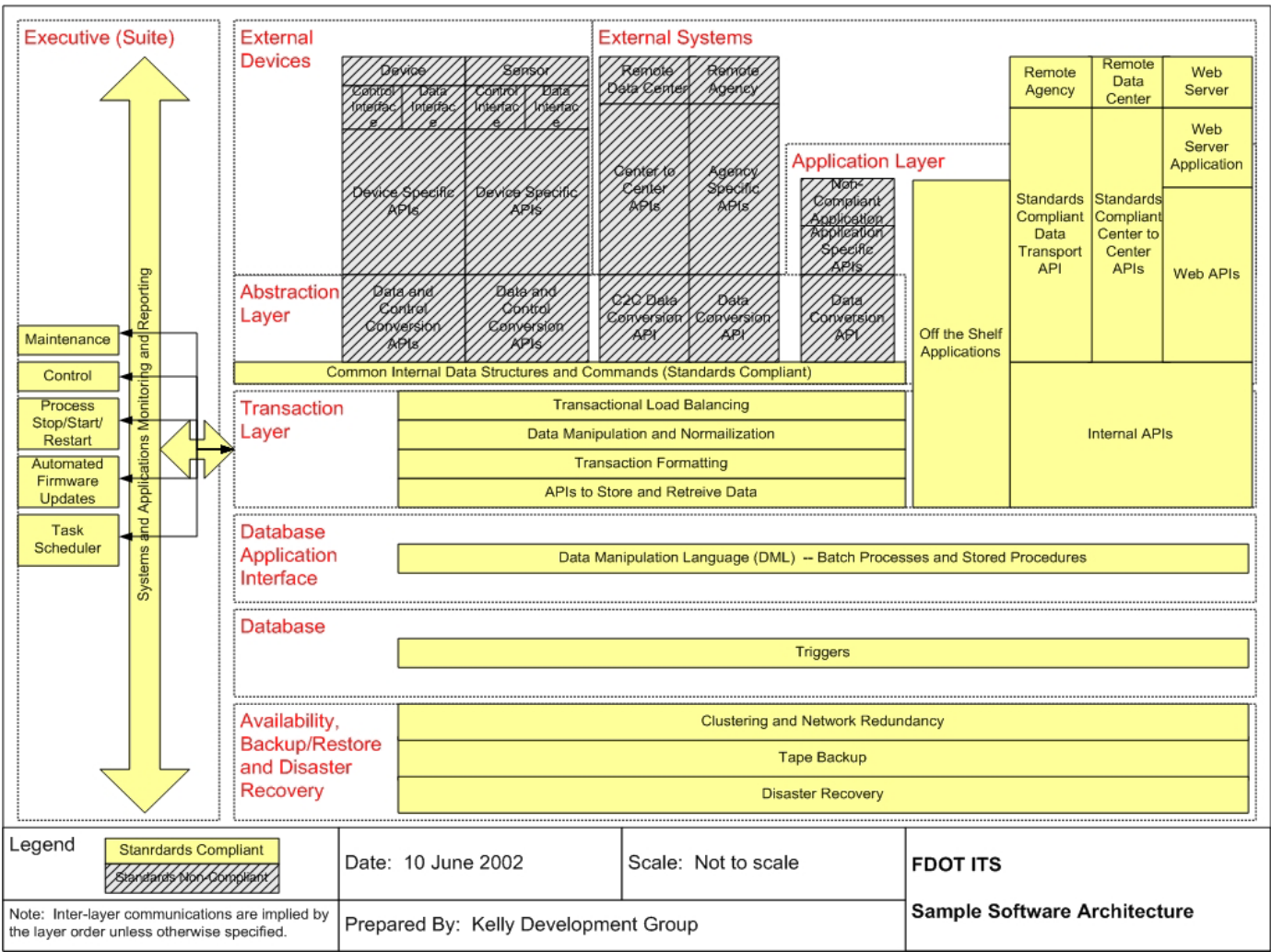
3.1 Statewide Transportation Management Center Software Library System Database

As ITS services are still maturing, the formats and content of input and output data are expected to change over time. To support these expected changes, an abstraction layer should be incorporated to translate between disparate input and output formats and the internal Statewide Transportation Management Center Software Library System format. The abstraction layer should be modular, with the input and output functions of the software defined in separate, fully independent modules. This flexible approach allows the simple addition of new input devices into the transaction layer. Consideration should be given to enhancing the flexibility of data representation through the incorporation of an extensible markup language (XML) and its associated protocol extensions where appropriate.

- DB001   A modular abstraction layer shall be incorporated in the Statewide Transportation Management Center Software Library System to translate between different input and output formats and the internal System database format.

- DB001A   The abstraction layer shall be modular with the input and output functions of the software defined in separate, fully independent modules.

3.1.1 Abstraction Layer

Each device – typically a camera, a sensor, a dynamic road sign, etc. – has one or more physical interfaces over which device-specific control commands can be sent to the device. These control commands, while often similar in purpose among devices with similar functionality (i.e., most moveable cameras incorporate the ability to change the viewing angle and field of view – pan/tilt/zoom), the command set syntax for each device is typically non-standard and unique to the device and/or device manufacturer. A similar situation exists in the case of the data interface for each device. Over time, it is expected that these devices will become increasingly diverse, as next-generation products are released while older products are still in service. As the diversity of devices increases, the management of these devices has the tendency to become proportionally more complex.

In an effort to constrain the increased complexity of device management over time, an object-oriented abstraction approach is suggested, whereby devices within a particular class could be virtualized into a single control and data class representing a superset of the normalized functionality represented by the objects in the class. While all objects in the class may not support a particular function, the majority of the objects in the class would support the majority of the functions defined in the superset. Each unique device in the class would have a unique data and control conversion module application program interface (API) that will abstract the command and data format expected by the device-specific APIs into the common format defined by the device superset class.

The abstraction layer will translate between the various external vendor formats and a consistent, internal, standards-compliant format. This abstraction layer would likely be based on some type of data dictionary, possibly in an object-oriented management information base (MIB)[4]-like format for the sake of simplicity. The most logical place for the abstraction layer to be implemented is on the database transaction server.

The abstraction layer provides the mechanism to easily incorporate additional future devices, regardless of standards compliance. The abstraction layer should be implemented as a set of modular, independent APIs specific to the component for which they are intended, so that individual abstraction modules can be plugged in as required and the modules can be shared between districts that require similar devices. In the case of abstracting applications that expect to access non-compliant structured query language (SQL) databases or a database with a different internal format, the abstraction layer could be implemented as a SQL proxy, taking SQL requests from the external application, translating the request into a known internal format, interacting with the internal database, and returning the appropriate response to the application client.

- DB002   The database shall be capable of accessing non-compliant SQL databases or a database with a different internal format.

- DB002A   The abstraction layer shall be implemented as an SQL proxy, taking SQL requests from the external application, translating the request into a known internal format, interacting with the internal database, and returning the appropriate response to the application client.

In the case of standards compliant applications that comply with the structure of the internal database, the transaction layer can be implemented as a virtual layer within the application. In this case, the application server would bypass the transaction server altogether and access the database server directly.

- DB003A   The transaction layer shall be implemented as a virtual layer within the standards compliant applications.

Although not often included in the software, clustering and disaster recovery shall be considered in the overall software architecture, as the methods chosen to protect database applications are highly dependent on database requirements as well as on the requirements for the recovery point objective and the recovery time objective. Recovery point objective is defined as the difference between the production copy of data and the replicated copy, in other words the amount of changed data that would be lost if recovery from the replicated data set was required. Recovery time objective is defined as the maximum acceptable amount of system downtime before business operations are critically impacted.

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[4] MIB is a database of objects that can be monitored by a network management system.

- S007 Clustering and disaster recovery capabilities shall be provided for in the TMC software architecture.
- DB003 The Statewide Transportation Management Center Software Library System shall have a recovery point objective of having less than one-tenth percent (0.1%) difference between the master database and the recovery copy of the database at all times.

- DB001R The recovery time objective shall be one hour or less.

3.2 Executive Handler

- S008 The Statewide Transportation Management Center Software Library System shall have an executive function that handles all monitoring and reporting of the status of external devices and internal processes.

The executive process will monitor all devices and processes, including external devices such as cameras and sensors, network communications link status, internal systems and hardware components, software processes, and database processes. It is envisioned that the executive process will have similar capabilities to those available in commercial network management suites such as HP OpenView and CA UniCenter.

The executive handler can be implemented as an off-the-shelf application or a custom-built application. If an off-the-shelf application such as HP OpenView or CA UniCenter is selected, custom drivers will likely be required to monitor specific external devices and internal processes; therefore, some customization is expected to be required; however, the advantage of an off-the-shelf solution, despite customization, is that the monitoring and reporting framework is provided, significantly reducing development requirements.

- EX001 As a minimum, the executive handler shall provide:
  - o Process initiation/termination;
  - o Process status and monitoring; and
  - o Error logging.

3.2.1 Process Initiation / Termination

- EX002 The executive handler shall be capable of automatic (scheduled) and manual initiation, termination, and re-initiation of system processes.

Comprehensive centralized process control is preferable, wherein all processes in the software stack – from the periodic maintenance checks of external devices to the scheduling of tape backups.

- EX003   The executive handler shall have the capability to read scheduled process control from the central database.

- EX004   The executive handler shall also have the capability to group dependencies between applications and resources into hierarchical subsystem groups, so that if a failed application's required resource has been determined to be offline, unavailable, or exhausted, the application can be failed over to an alternate processor or appropriate notification can be initiated.

In the case of a failure, the executive handler should understand the proper order of dependencies in order to start processes in the correct expected order.

- EX001F   In the case of a failure, the executive handler shall start processes in the same order that they originally started.

o EX002F   In the case of a process failure due to unavailable resources, the executive handler shall have safeguards to prevent the unrestrained cyclical restart of failed applications.

- EX005   The executive handler shall have the ability to initialize individual components as well as subsystem groups.

3.2.2   Process Status and Monitoring

- EX006   The executive handler shall be capable of monitoring, reporting, and displaying the status of all subsystems, subsystem components, and network communications links and components.

- EX001D   The executive handler shall provide a hierarchical view of the system allowing the user to drill down from a subsystem level to an individual component level.

- EX001M   Monitoring shall include pertinent system information, such as the current system state, as well as historical information such as system performance, uptime, and error logs.

- EX002M   All information collected shall be capable of being stored in the database.

- EX001R   Reporting functions shall include the ability to send event notifications via email and/or pager and/or telephone, as well as visual and audio notifications at the user console.

- EX002R   All event notifications shall be stored in the central database and be tagged with the system time to the nearest second and date of occurrence.

3.2.3 Error Logging

Error logging should be flexible and provide tunable levels of verbosity to facilitate enhanced troubleshooting. Levels of verbosity should be tunable on-the-fly without having to restart the individual application. Separate log files should be used for each application. Each log message should be time stamped and should provide some indication as to the origin of the message.

- EX007   The executive handler shall log error conditions as they are detected.

- EX001L   The amount of data logged for an error condition shall be able to be adjusted in real-time by the user through the GUI without having to restart the application.

- EX002L   Separate log files shall be used for each application monitored.

- EX003L   Each log file message shall be time stamped and shall provide some indication as to the origin of the message (i.e., what process reported or detected the error).

3.2.4 Device Drivers (General)

- EX009   Device drivers shall communicate to the field devices through FDOT networks and perform the following:
  - o Set or check the date and time;
  - o Poll the device on a periodic basis as specified in the database and retrieve device status;
  - o Check the cyclic redundancy check of the device operating parameters and message library against the cyclic redundancy check parameters of the database;
  - o Download operating parameters;
  - o Upload the current operating parameters and display on user's workstation;
  - o Display all database parameters and attributes on the user's workstation as appropriate to the device;
  - o All uploaded information from the device shall be displayed at the user's workstation;
  - o The operator, with proper security, shall be able to display/change database messages and parameters;
  - o A log of all changes shall be maintained by time and operator identification;
  - o Provide a device test mode set of commands;

> o Provide a method for restricted access to selected devices based upon incident management criteria;
> o Provide a log of all communications events to and from the device including the report of device errors; and
> o Provide the capability to stop and restart the device driver via operator control.

3.3 Transportation Management Center (TMC) Software Configurability

The TMC software solution should be database-driven and configurable wherever possible through user-defined tables.

- UT001   Tables shall exist in the Oracle database for entry of GUI workstation users and parameters to set up, control, and communicate with devices such as DMSs, CCTV cameras, loop controllers, and other devices.

3.3.1 Table Update

- UT002   The Statewide Transportation Management Center Software Library System shall allow users with proper security permissions to update database tables from the GUI workstations.

- UT003   Data collected from device communications software shall update the database tables as soon as data is received.

- DB004   An option shall be provided for FDOT to store historical data for traffic management devices for a specified amount of time programmable at the system administrator level.

3.3.2 Parameter Selection

- UT004   The Statewide Transportation Management Center Software Library System shall support the specification of field device parameters for the creation and control of field devices such as camera control, DMS message content, video wall control, ramp meters, and other devices.

- UT005   Table parameters shall provide for current status of such devices and allow for the creation of status lists based on device.

3.3.3 Report Capability

- S009   The Statewide Transportation Management Center Software Library System shall support the creation of reports by restricted knowledgeable users.

- WS007   All reports shall be selected from a print menu on the operator's workstation and shall contain location parameters that indicate roadway segment links. The report will be printed with controls for page setup and for how many copies are printed.

The software contract vendor is expected to propose the format and content of system reports during the detailed software design phase.

3.4   Data Distribution within a Regional Transportation Management Center (RTMC)

Distribution of real-time, camera-generated and software application-generated video data will be handled at each TMC either digitally or through analog video switches and multiplexers. The Statewide Transportation Management Center Software Library System will need to support the operator's selection of which camera video to view or to route to a video wall and to control the camera through a pan-tilt-zoom control that may be implemented through software. If analog video is used at a particular TMC, a mechanism is expected to be provided to convert video interfaces to supported formats from connector types that are not natively supported on the video multiplexer.

- S010   The Statewide Transportation Management Center Software Library System shall provide a function to distribute data in real-time. Data shall include but not be limited to:
  - o Travel time data;
  - o Speed data; and
  - o Video images.

- DD001   The data distribution function shall be capable of retrieving data from the database and updating user workstations with the data as soon as it is received into the database.

- DD002   The user shall be capable of selecting the data to be displayed by the data distribution function.

3.5 System Support

- S011 The TMC Software shall support the automation of system support tasks through the use of user modifiable scripts for the following functions:
  - o System scheduler;
  - o System backup;
  - o Data archiving;
  - o Maintenance of system integrity; and
  - o Data links to other FDOT computer systems.

It is expected that the Contract Vendor will provide FDOT with various system support scripts to maintain the system integrity and provide a data link to other FDOT computer systems. These user modifiable scripts will be restricted to users with appropriate security access.

3.5.1 System Task Scheduler

All the batch jobs, backups, and performance evaluation tools are required to be incorporated in the Statewide Transportation Management Center Software Library System. For any job pertaining to inside the database, it is recommended that a job scheduler trigger be used.

- SS001   The system support function shall store the history information pertaining to the status of a job inside the Oracle database table for the future references.

- SS002   All other backups, background, batch, and performance evaluation jobs shall be documented and be able to be used as operating system schedulers such as "cron" jobs.

3.5.2 System Backup

The database and the operating system shall be backed up fully on a daily basis, at a specific time agreeable by the users. The backup script shall shutdown the database and take make a complete backup of all database-related files. If a redundant array of independent (or inexpensive) disks (RAID) system is utilized that allows mirroring, then the database shall not be shut down.

- SS001B The system support function shall provide an automated backup component that can be programmed to perform one or more backups throughout the day at a specific clock time.

- SS002B The backup components shall shutdown the database and take the complete backup of all database-related files unless a RAID system is used that allows mirroring.

3.5.3 Archiving

The database shall be archived on the timeframe agreed to by the users of a file usable by any other database for the reporting purposes. The archiving script and report shall be defined and all the procedures shall be documented.

- SS001A   The system support archiving component shall provide automated archiving of data to a common file usable by external databases for reporting purposes.

- SS002A   At a minimum, the system support archiving component shall archive the following information:
  - o   Incident history data;

o   Device status logs;
o   Detector data; and
o   System logs.

The Contract Vendor must coordinate with the FDOT TranStat Office to determine the format of the data required for performance monitoring and deployment evaluation including data input to the HPMS.

- SS003A   The format of the archived data shall comply with standards set by the FDOT TranStat Office that are required for performance monitoring and deployment evaluation, including data input to the HPMS.

3.6 Security

- S026   The FDOT Statewide Transportation Management Center Software Library System shall provide network security through a hardware/software firewall.

- NW001   The firewall shall provide EAL-4+ certification employing a "default deny" security policy. Both ASCII and binary logging shall be available and enabled.

- NW002   A multi-layer DMZ model shall be used to segment traffic coming into the transaction server(s) from public LAN connections (if any) by being able to access the database layer.

3.6.1   Workstation Security

Workstation security will be handled by the operating system's ability to allow users and groups to access certain functionality in the system. The users and groups activities can also easily be detected and monitored with built in operating system functionality.

- S012   The Statewide Transportation Management Center Software Library System operating system shall provide workstation security functions.

- WS001   The workstation security function shall provide the capability to assign specific users and groups to categories that have specific access to levels of the software functionality.

- WS002   The workstation security function shall use encrypted passwords to identify which users or groups can access what levels of software functionality.

3.6.2 Users and Groups

Standard groups and users will be created under the security of the operating system. These groups will have a standard set of functions they are allowed access.

- WS003   Each user added to a group shall inherit the functionality of the group.

- WS004   In the event of a workstation failure, users shall be able to log into other workstations and have the same functionality they would if they were at their own workstation.

3.6.3 Operating System Functionality Security

Using the operating system security, operating system functionality (access to disk drives, system configuration, etc.) will not be provided to the standard GUI interface operator. Only system administrators will have this functionality.

- WS005   Only system administrators shall have access to the security of the operating system and operating system functionality (access to disk drives, system configuration, etc.)

3.6.4 Graphical User Interface (GUI) Software Module Security

GUI workstation software modules should be protected so that each software module set will be assigned a group that has execution privileges. This provides for limited functionality based on the group the user who is logged belongs to. Only users belonging to the specified group can run the software modules. Users should not be able to go to the operating system prompt and run software modules without a user name and password.

- WS006   GUI workstation software modules shall be protected so that each set of software modules will be assigned a group that has execution privileges.

3.7   Mapping / Display

- S013   The Statewide Transportation Management Center Software Library System shall provide software to control a video wall.

3.7.1 Video Wall

- VW001   The video wall function shall include an interface to a video wall and wall controller that is capable of displaying multiple graphic displays and video

images simultaneously on a video wall made up of display cubes – minimum size of nine (9) cubes, arranged three by three (3 x 3).

- VW003 The video wall function shall support the addition of extra "cubes" to enlarge the total display area up to at least 200 percent of the original baseline of nine (9) cubes.

- VW004 All display characteristics of the video wall shall be accessible via a user interface within the control center software.

- VW005 Any workstation on the TMC network that is physically located in an area where its user is able to view the video wall shall be capable of controlling all video wall functions.

- VW006 The Video Wall function shall, at a minimum, provide the following control capabilities:
  o Setup controls (brightness, hue, saturation, etc.);
  o Display layout (placement and sizing of graphics and video being displayed); and
  o Selection of video and graphical content to be displayed.

3.7.2 Video Wall Control

- VW007 At a minimum, the Statewide Transportation Management Center Software Library System shall control the video wall using an RS-232C and/or RS-422 serial data format.

3.7.3 Geographic Information System (GIS) Interface

- S014 The Statewide Transportation Management Center Software Library System shall provide a GIS interface that is compatible with the ESRI ArcView/MapObjects.

- GS001 The Statewide Transportation Management Center Software Library System GIS function shall use the ArcView/MapObjects software client to view GIS-formatted data such as traffic speed, incidents, message sign data, and device status.

- GS002 Data such as traffic speed, incidents, message sign data, device status, and other data shall be viewable from PTMCs, VTMCs, RTMCs, and the FDOT Central Office.

- GS003 The ArcView/MapObjects software client shall be a Microsoft Windows executable program, connecting via TCP/IP and direct Oracle drivers [not

open database connectivity (ODBC)] to the Oracle database to display the desired highway map and devices.

Upon connection, the user will enter a user identification and password. Functionality such as entering sign messages, incidents, and other functions of the GUI workstation, will be provided if the user has sufficient permissions associated with their user identification and password. At a minimum, a T1 or frame relay connection should be used for maximum speed. Figure 3.2 is a graphical representation of the software and hardware components that will allow remote viewing of selected data and maps.

- GS004   The GIS function shall support remote viewing of data through a TCP/IP connection at a minimum speed of 1.544 million bits per second.

Figure 3.2 – Geographic Information System (GIS) Software and Hardware Components for Remote Viewing
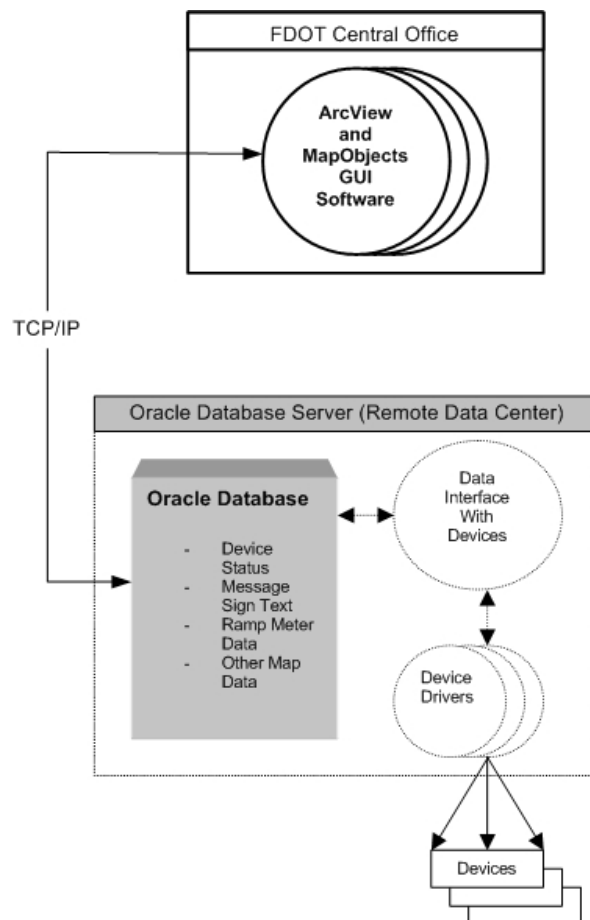
3.8 Closed-Circuit Television (CCTV) System

- S015   The Statewide Transportation Management Center Software Library System shall interface with CCTV cameras used for traffic surveillance.

3.8.1 Cameras

- TV001   At a minimum, the CCTV function shall provide device drivers for the following camera types:
  - o Dome camera systems;
  - o Component pan/tilt systems; and
  - o Fixed-mount cameras.

3.8.2 Camera Communications and Control

- TV001D   The device drivers shall be capable of controlling pan/tilt/zoom camera systems manufactured by a number of different manufacturers.

- TV002D   The system shall be capable of controlling traditional pan/tilt units as well as the dome camera systems that are commonly deployed in ITS applications.

- TV003D   Whenever possible, the NTCIP protocol standard shall be utilized for camera control and communications.

- TV004D   An alternate to the NTCIP protocol shall be through device drivers that can be selectively loaded and unloaded by the system's camera control application on an as-needed basis.

- TV005D   Manufacturer-specific drivers shall, at a minimum, provide functionality equal to that provided via NTCIP mandatory objects.

- TV006D   The Statewide Transportation Management Center Software Library System shall communicate with CCTV cameras using serial communications (i.e., RS-422, RS-232, and RS-485) over a variety of transmission media (i.e., fiber optic, copper, and wireless) and be capable of baud rates equal to or greater than 1,200 bps. The CCTV driver shall also support cameras with IP based controls.

3.8.3 Closed-Circuit Television (CCTV) Range Objects

- TV007D   The CCTV range objects shall be implemented in the device drivers and at a minimum shall include:
    - o   A maximum number of presets parameters;
    - o   Pan left limit parameters;
    - o   Pan right limit parameters;
    - o   Pan home position parameters;
    - o   True north offset parameters;
    - o   Tilt up limit parameters;
    - o   Tilt down limit parameters;
    - o   Zoom limit parameters;
    - o   Focus limit parameters;
    - o   Iris limit parameters;
    - o   Maximum pan step angle parameters; and
    - o   Maximum tilt step angle parameters.

3.8.4 Closed-Circuit Television (CCTV) Timeout Objects

- TV008D   The device drivers shall contain the CCTV timeout objects and shall include the following parameters, at a minimum:
    - o   Pan timeout parameters;
    - o   Tilt timeout parameters;
    - o   Zoom timeout parameters;
    - o   Focus timeout parameters; and
    - o   Iris timeout parameters.

3.8.5 Closed-Circuit Television (CCTV) Preset and Positioning Objects

- TV009D   The device driver shall contain CCTV preset objects and shall include the following parameters, at a minimum:
    - o   Go to preset position parameters;
    - o   Store preset position parameters;
    - o   Pan position parameters;
    - o   Tilt position parameters;
    - o   Lens zoom position parameters;
    - o   Lens focus position parameters; and
    - o   Lens iris position parameters.

3.8.6 Closed-Circuit Television (CCTV) System Feature Control Objects

- TV010D The device drivers shall contain CCTV system feature control objects and shall contain the following parameters and characteristics:
  - o System camera feature control parameters;
  - o System camera feature status;
  - o System camera equipment availability parameters;
  - o System lens feature control parameters;
  - o System lens feature status parameters; and
  - o System lens equipment availability parameter.

3.8.7 Closed-Circuit Television (CCTV) Alarm Objects

- TV011D The device driver shall contain the following CCTV alarm objects:
  - o Alarm status parameters;
  - o Alarm latch status parameters;
  - o Alarm latch clear parameters;
  - o Temperature alarm high-low threshold;
  - o Temperature alarm current value parameters;
  - o Pressure alarm high-low threshold parameters;
  - o Pressure alarm current values;
  - o Washer fluid alarm high-low threshold parameters;
  - o Washer fluid alarm current value parameters; and
  - o Alarm label index parameter.

3.8.8 Closed-Circuit Television (CCTV) Discrete Input Objects

- TV012D The device driver shall contain the following CCTV discrete input objects:
  - o Discrete input status parameters;
  - o Discrete input latch status parameters;
  - o Discrete input latch clear parameters; and
  - o Discrete input label index parameters.

3.8.9 Closed-Circuit Television (CCTV) Discrete Output Objects

- TV013D The device driver shall contain the following CCTV discrete output objects:
  - o Discrete output status parameters;
  - o Discrete output control parameters; and
  - o Discrete output label indexes.

3.8.10 Closed-Circuit Television (CCTV) Zone Objects

- TV014D   The device driver shall contain the following CCTV zone parameters:
  - o   Maximum number of zones parameters; and
  - o   Zone tables.

3.8.11 Closed-Circuit Television (CCTV) Label Objects

- TV015D   The device driver shall contain the following CCTV label objects:
  - o   Maximum number of labels parameters;
  - o   Label tables;
  - o   Label location parameters; and
  - o   Enable label text displays.

3.8.12 Closed-Circuit Television (CCTV) On-Screen Camera Menu Objects

- TV016D   The device driver shall contain CCTV On-Screen Camera Menu Objects
  - o   Activate menu parameters; and
  - o   Menu control parameters.

3.8.13 Video / Data Transmission

The system shall incorporate a variety of technologies for the transmission of video and data between field hardware, subsystems, TMCs, and additional remote locations. These enabling technologies shall provide a transparent transport mechanism for the collection and dissemination of video signals, video device control, and system data.

- TV002   The CCTV function shall incorporate the following technologies for the transmission of video and data between field hardware, subsystems, TMCs, and additional remote locations:
  - o   Fiber optic transceivers;
  - o   Fiber optic video/data multiplexers;
  - o   Mpeg encoders/decoders; and
  - o   Wireless.

3.8.14 Video Switching and Routing

- TV001S   The CCTV function shall allow any video signal from any field device to be displayed on any video monitor or desktop workstation within the TMC system.

Multiple users should be able to monitor the same video signal simultaneously, though control of pan/tilt/zoom or other functions may be limited to only one user at a time based on the assigned user rights and privileges. To accomplish this type of video and control distribution, it is anticipated that the system will incorporate a variety of devices designed for video switching and distribution, including the following:

- o   Video matrix switches;
- o   Video routers;
- o   Distribution amplifiers;
- o   Video capture devices;
- o   LAN and wide area network (WAN) distribution;
- o   Video capture; and
- o   Video multicast.

- TV002S   The CCTV function shall allow the same video image to be viewed simultaneously from multiple workstations without conflict.

- TV003S   The CCTV function shall incorporate software logic to allow only one workstation at a time to control a particular CCTV unit.

3.8.15 Video Display and Monitoring

In addition to the primary video wall, the TMC will utilize a variety of equipment designed for video display and monitoring. This equipment shall include, but not be limited to, traditional cathode ray tube (CRT) video monitors, flat panel technologies [i.e., liquid crystal diode (LCD) and plasma), and projection systems. Other devices, such as quads and multiplexers, shall allow a single monitor to display multiple video images from multiple sources.

- TV004S   The Statewide Transportation Management Center Software Library System shall provide the capability for a single workstation monitor to display multiple video images from multiple sources.

3.9   Incident Detection

The Statewide Transportation Management Center Software Library System shall rely on algorithms to detect incidents using data collected from vehicle sensors installed on the freeway.   The data collected at the RTMCs shall be vehicle occupancy, volume, and speed. The Contract Vendor shall present to FDOT the proposed algorithm and indicate the algorithm's performance. The performance shall have been documented and expressed in incident detection rates and the percent of false alarms.

- ID001   The Statewide Transportation Management Center Software Library System shall support the detection of incidents or congestion via a software algorithm that determines occupancy, volume, or speed and makes a determination based on user-defined thresholds.

- ID002   The Statewide Transportation Management Center Software Library System shall provide the ability to view a congestion report for all roadway segments in the system. The congestion report shall include a graphical display and the following information for each roadway segment in the system:
  o   Roadway segment identifications;
  o   Source of the incident or congestion information;
  o   Reported speeds [in miles per hour (MPH)];
  o   Historic speeds (in MPH);
  o   FDOT's LOS;
  o   Congestion cases (i.e., closed, heavy, moderate, none, or free flow); and
  o   Other recommended parameters.

- ID003   The workstation operator shall have the ability to view an incident or congestion raw data report for all links in the system.

- ID001W   The displays shall result from a comparison between all possible sources of data derived from real-time data, operator input, or historical data as determined by the algorithm.

- ID002W   The report shall include graphical displays and the following information for each roadway segment in the system:
  o   Roadway segment identifications;
  o   Roadway segment geometries;
  o   Source names (determined by the algorithms);
  o   Reported speed, volume, and occupancy; and
  o   Congestion case.

- ID004   The workstation operator shall have the ability via a menu and the selection of a link on a map to enter manual incident or congestion information. The incident or congestion information the user may enter shall include:
  - o Congestion case (i.e., closed, heavy, moderate, none, or free flow)
  - o Incident types;
  - o Roadway weather conditions; and
  - o Incident duration (i.e., the amount of time the incident will last).

- ID005   The system shall have a map display of the current incident or congestion for each segment. The map shall change the color of the roadway segment based on the current condition. An algorithm will determine the congestion case.

3.10 Traffic Detector Function

- S016   The Statewide Transportation Management Center Software Library System shall utilize real-time and archived data from a variety of sources to determine and report current and predicted traffic conditions for any segment of roadway within the scope of system coverage.

Traffic detector stations placed at strategic locations within the system will provide field data to the Statewide Transportation Management Center Software Library System through a variety of communications links. The installation and communications link installation is outside of the scope of the Statewide Transportation Management Center Software Library system. Interfaces from the Statewide Transportation Management Center Software Library System to the communications link are included in the scope.

3.10.1 Traffic Detectors

- TD001   The Statewide Transportation Management Center Software Library System shall be capable of collecting traffic data from a variety of in-ground and above-ground traffic detection technologies including, but not limited to, inductive loop systems, radar systems, and video detection systems.

The traffic detectors such as video detection, millimeter wave radar detector (MWRD), and in-ground inductance loops are expected to provide real-time volume, speed, and occupancy data via a variety of communications links such as:

- o Dial-up modems through local telephone companies;
- o T1 serial data through dedicated data lines; and
- o Synchronous optic networks (SONET), asynchronous transfer modes (ATM), or Ethernet fiber optic networks (FON).

3.10.2 Traffic Detector Communications and Control

Typically, traffic detection devices are capable of collecting and transmitting data at intervals including ten (10), twenty (20), and thirty (30) seconds, and one (1), five (5), ten (10), fifteen (15), thirty (30), and sixty (60) minutes.

- TD002   The Statewide Transportation Management Center Software Library System shall be able to receive and process traffic data in time intervals including, but not limited to:
  - o   Ten (10) seconds;
  - o   Twenty (20) seconds;
  - o   Thirty (30) seconds;
  - o   One (1) minute;
  - o   Five (5) minutes;
  - o   Ten (10) minutes;
  - o   Fifteen (15) minutes;
  - o   Thirty (30) minutes; and
  - o   Sixty (60) minutes.

- TD003   To the maximum extent possible, the NTCIP standard for transportation sensor systems shall be utilized for traffic detector communications.

- TD004   The Statewide Transportation Management Center Software Library System shall provide protocol software to communicate with traffic detectors and detection subsystems using serial and/or Ethernet connections over a variety of transmission media (i.e., fiber optic, copper, and wireless) that are capable of baud rates greater than or equal to 1200 bits per second.

- TD005   For traffic detectors within the system that do not support NTCIP, control of these devices shall be supported through device drivers that can be selectively loaded and unloaded by the system's traffic detector application on an as-needed basis.

Traffic detectors that use non-NTCIP standards are to be purchased from manufacturers whose specific drivers provide a functionality equal to that provided through NTCIP mandatory objects. Specification and deployment of traffic detectors is outside the scope of this specification.

3.10.3 Device Driver Data Elements

- TD006   The device driver for vehicle detectors shall contain the following categories of data elements:
  - o   System setup data elements;
  - o   Control data elements; and
  - o   Inductive loop detector data elements.

- TD001D   The transportation sensor system setup data elements shall at a minimum contain the following:
  - o   Sensor system reset parameters;
  - o   Sensor system status parameters;
  - o   Sensor system occupancy type parameters;
  - o   Maximum number of sensor zones parameters;
  - o   Sensor zone tables; and
  - o   Clock available parameters.

- TD002D   The transportation sensor system control data element shall at a minimum contain the following:
  - o   Maximum number of outputs parameters;
  - o   Output configuration tables;
  - o   Maximum number of output groups parameters;
  - o   Output group tables;
  - o   Data collection tables; and
  - o   Data buffer tables.

- TD003D   The transportation sensor system inductive loop detector data element shall at a minimum contain the following data elements:
  - o   Loop system setup tables;
  - o   Loop output conditioning tables; and
  - o   Loop system status tables.

3.11 Incident Management Functions

The Statewide Transportation Management Center Software Library System shall provide the capability to detect, manage, and record incidents in an automated manner with very user-friendly interaction with the TMC. To avoid confusion with the inventory/maintenance functional requirements, the letters "TM" identify the incident management functional requirements.

- TM001   The Statewide Transportation Management Center Software Library System's incident management function shall minimize the number of key strokes required for the entry of traffic incidents while providing drop-down

menus, check boxes, and data interfaces with subsystems such as the road weather information systems (RWIS), vehicle detection, motorist aid, automatic vehicle identification (AVI), DMSs, and CCTVs.

- TM002 The incident management function shall acquire data from the vehicle detection subsystem and include the following functionality at a minimum:
  - o Incident verification;
  - o Motorist information;
  - o Response
  - o Site management;
  - o Traffic management; and
  - o Incident clearance.

3.11.1 Incident Verification

Incident verification encompasses confirming that an incident has occurred, determining the exact location and direction of travel, and obtaining and assessing as many details as possible.

- TM003 Workstation GUI screens shall support the entry of the exact location and direction of travel data as efficiently as possible.

Verification is completed by operations center personnel who communicate with the incident responders on the scene and view incidents on monitors.

- TM003W The incident management function shall support operator entry of the incident type, such as HAZMAT spills.

3.11.2 Motorist Information

The dissemination of motorist information is one of the primary services provided by a RTMC. The incident management system provides information to a function that disseminates the information to motorists and the media.

- TM004 The incident management function shall distribute video feeds, traffic flow and incident information, and traffic event data until the incident is cleared and the traffic flow is back to normal.

- TM001I The incident management function shall format information for distribution to the following dissemination media:
  - o HAR;
  - o Commercial radio broadcast;
  - o Internet Web servers;
  - o DMSs;

    o 511 Telephone systems;
    o Commercial and public televisions;
    o Facsimile machines and pagers; and
    o Additional dissemination mechanisms provided by the dissemination function.

3.11.3 Incident Response

Incident response entails the deployment of the appropriate personnel, equipment, communications links, and motorist information as soon as possible after incidents have been reasonably verified. The incident management function shall assist an RTMC in understanding an incident's nature, scope, and the steps necessary for incident response.

- TM005   The incident management function shall provide the workstation operator with personnel lists and contact numbers as well as a catalog of agency resources via drop-down menus.

- TM001R The personnel list shall be on a geographic basis and, at a minimum, shall include:
    o Response personnel and contacts;
    o Geographic agency responsibilities;
    o Talk list (i.e., responders contact list);
    o Radio frequencies;
    o Phone and facsimile numbers; and
    o Pager numbers.

- TM002R The incident management function shall support CAD of the FDOT Road Rangers Service Patrols and contract towing companies.

- TM003R The incident management function shall support the cataloging of incident management teams and resources with a listing of equipment, material, and available personnel who possess special skills.

The catalog will include a wide variety of special services that are required to resolve freeway incidents and are specified by FDOT. This catalog of resources will be organized by incident type.

- TM004R The incident management function shall provide a quick click interface to the GIS maps for the display and location of resources, i.e. fire hydrants.

3.11.4 Site Management

The process of site management requires accurate assessment of incidents, the proper establishment of priorities, coordination with the appropriate agencies, and the maintenance of adequate communications with each responder. The RTMC will assist the incident commander to accomplish these objectives through center-to-center communications.

- TM006   The incident management function shall provide the workstation operators with GUI screens that record accurate information regarding the incident's current status, the overall progress towards clearance, and the equipment required to complete the process.

3.11.5 Traffic Management

Traffic management is the application of traffic control measures at incident sites and on facilities affected by incidents. The goals are to minimize traffic disruption while maintaining a safe workplace for the responders.

- TM007   The incident management function shall support the RTMC with traffic control procedures that include, at a minimum, point traffic control at the scene, managing the roadway space, and deploying personnel to better manage the traffic by improving traffic flow past incident sites and on to alternate routes.

Intelligent processing should be used by the incident management function to suggest responses or action plans in response to incident types.

- TM005R The incident management response function shall recommend a set of DMS locations and messages for the workstation operator to select. In addition, HAR messages shall be activated.

- TM006R The incident management response function shall recommend a set of HAR messages to be activated.

To improve traffic flow on alternate routes, the incident management function is expected to actively manage traffic control devices in areas where traffic flow is impacted and designate and maintain the operating alternate routes.

- TM007R The incident management response function shall display, on the GIS map, recommended alternate routes in response to incidents that are blocking roadways.

- TM008R In response to incidents requiring alternate route(s), the workstation operator shall be able to select alternate maps via properly named drop down menus.

- TM009R When appropriate, the incident management response function shall communicate with detour message signs indicating recommended alternate routes.

- TM010R The incident management response function shall support a hierarchy of traffic management activities and display these activities for review by RTMC managers.

3.11.6 Incident Clearance

Clearance is the process of removing vehicles, wreckage, debris, spill material, and other items from the roadway. The incident management response function will facilitate this critical process through management of FDOT road-crew resources.

- TM008 The incident management response function shall provide support to the clearance process by the cataloging of resources for the removal of the all types of incidents.

- TM011R Included in the catalog shall be the resource, location, cost of service, and availability of related equipment and resources.

3.12 Road Weather Information System (RWIS)

- S017 The Statewide Transportation Management Center Software Library System shall utilize real-time data from a variety of sources to determine and report current weather and road surface conditions for any segment of roadway within the scope of system coverage.

Weather and roadbed information stations placed at strategic locations within the systems will provide field data to the central system via a variety of communications links.

3.12.1 Road Weather Information System (RWIS) Communications and Control

- RW001 The NTCIP standard for environmental sensor stations (ESS) shall be utilized for the RWIS interface communications to the maximum extent possible.

- RW002 The RWIS interface function shall provide protocol software to communicate with RWIS field units using serial and/or Ethernet connections over a variety of transmission media (i.e., fiber optic, copper, and wireless).

These media shall be capable of baud rates equal to or greater than 1,200 bits per second.

- RW003 For RWIS elements within the system that do not support NTCIP, control of these devices shall be supported through device drivers that can be selectively loaded and unloaded by the system's interface application on an as-needed basis and that provide functionality equal to that provided via NTCIP-mandatory objects.

- RW004 The RWIS interface function shall provide for object-oriented data elements.

- RW001D The RWIS interface function shall provide for the following global object definitions:
  - o Database management;
  - o Time management;
  - o Report;
  - o Simple transportation management protocol (STMP); and
  - o Pulse position modulation protocol (PPMP).

3.12.2 Object Definitions for Environmental Sensor Stations (ESSs)

- RW002D The RWIS interface function shall provide the following object definitions for ESSs:
  - o Pressure;
  - o Wind data;
  - o Basic temperature data;
  - o Enhanced temperature data;
  - o Basic precipitation data;
  - o Standard precipitation data;
  - o Enhanced precipitation data;
  - o Emerging precipitation data;
  - o Solar radiation;
  - o Visibility data;
  - o Standard pavement sensor data;
  - o Enhanced pavement sensor data;
  - o Standard sub-surface sensor data;
  - o Enhanced sub-surface sensor data; and
  - o Air quality.

3.12.3 Road Weather Information System (RWIS) User Interface

- RW005 The RWIS user interface shall be a software application within the Statewide Transportation Management Center Software Library System that displays data including, but not limited to, atmospheric data, pavement data, and forecasts.

- RW001U It shall be possible for any workstation within the Statewide Transportation Management Center Software Library System to access the RWIS user interface and the data from all RWIS system components statewide.

- RW002U The user interface shall provide the following data fields relative to each RWIS field unit:
  - Name;
  - Location;
  - Data age;
  - Air temperature;
  - Dew point temperature;
  - Relative humidity;
  - Precipitation type;
  - Precipitation intensity;
  - Precipitation rate;
  - Precipitation accumulation;
  - Visibility;
  - Average wind speed;
  - Wind gust speed;
  - Wind direction;
  - Surface sensor name;
  - Surface temperature;
  - Freeze point;
  - Chemical factor;
  - Chemical percent; and
  - Ice percent.

3.12.4 Road Weather Information System (RWIS) Field Hardware

The RWIS field hardware consists of the following hardware units:

  - Local processing units;
  - Sensors;
  - Towers; and
  - Cabinets.

3.13 Dynamic Message Signs (DMSs)

- S019   The Statewide Transportation Management Center Software Library System shall provide an interface to changeable message signs (CMSs) through a minimum of three drivers supporting:
  o NTCIP protocol;
  o Florida MIB (subset of the NTCIP standard);
  o The Management Information System for Transportation (MIST) system driver from District 5; and
  o Device drivers from manufacturers as specified by FDOT.

- DM001   The DMS software device driver shall be capable of sending all messages as defined in the DMS message database.

- DM002   The DMS software shall implement a database of standard messages.

- DM001D The DMS database shall contain a list and images of acceptable messages and words or messages that are unacceptable.

As a starting point, the DMS message database should be composed of existing standard messages maintained and used by each district. When similar messages that functionally convey the same message display, a single standard message should be developed from these messages, subject to district concurrence.

- DM002D The DMS database shall contain DMS internal operating parameters and internal messages.

- TB001   The Statewide Transportation Management Center Software Library System shall provide an interface to the dynamic and blank-out trail blazer signs.

3.13.1 Device Driver Functions

- DM003D The DMS device driver shall communicate to the DMS and perform the following:
  o Set or check date and time;
  o Poll the DMS on a periodic basis as specified in the database and retrieve DMS status;
  o Check the cyclic redundancy check of the DMS operating parameters and message library against the cyclic redundancy check parameters of the database;
  o Download operating parameters and DMS command messages;
  o Upload the current operating parameters and display on user workstation(s);

o Download message text and its attributes;
o Display all message text, database parameters, and attributes on the user workstation(s);
o Command the particular DMS message be stored in the message library;
o All uploaded information from the DMS shall be displayed at the user workstation(s);
o The operator, with proper security, shall be able to display/change database messages and parameters. A log of all changes shall be maintained by time and operator identification;
o Provide a DMS test mode set of commands;
o Provide a method for restricted access to selected DMSs based upon incident management criteria;
o Provide a log of all communications events to and from the DMS including any report of device errors; and
o Provide the capability to stop and restart the DMS device driver via operator control.

3.14 Motorist Aid System

Generally, the FIHS has motorist aid call boxes at one-mile intervals along the system. These call boxes allow motorists to contact the Florida Highway Patrol (FHP) for the purpose of dispatching a highway patrol officer. The call boxes produce latitude and longitude coordinates derived from global positioning system (GPS) fixes and are received at the FHP dispatch center. Co-location of FHP dispatch facilities with the RTMCs has been recommended. An electronic message of the call box activation will be provided to the RTMC.

- GS005   The GIS map covering the FIHS segment where a call box is activated shall display an icon indicating the call box activation.

- GS006   The Statewide Transportation Management Center Software Library System workstation operator shall have the capability to cycle the call box icon on and off.

3.15 Web Server / Public Access

- S020   The Statewide Transportation Management Center Software Library System shall provide a web server for private and public dissemination of TMC information.

- PA001   The web server shall capture and publish video from analog and digital video devices within the system for private and public dissemination via LAN, WAN, and the World Wide Web. The video server shall refresh and update the image at a rate set via parameters by the workstation operator.

- PA002   The web server shall provide secure access to system control functions of selected cameras as determined by the system administrator for users with high-speed Internet access.

- PA003   A browser-based control mechanism shall allow an authorized user to control and view video from any video device so long as the user has a high-speed Internet connection defined as an upstream connection speed greater than 256 thousand (256,000) bits per second (user to device).

- PA001U   A selectable menu of cameras shall be provided to the user.

- PA004   The web server shall provide a map showing the congestion levels and all current incidents on the highway. The map shall show where cameras and DMSs are located.

3.16 Center-to-Center Communications

The FDOT's *ITS Concept of Operations* identifies the RTMCs and indicates that the ITS deployments should coincide with programmed changes in the law enforcement dispatch operations and boundaries. The proposed RTMC dispatch co-locations and coverages were recommended to increase efficiency and cost-effectiveness and to coordinate deployment, development, and maintenance of the *Statewide ITS Architecture* (*SITSA*). The *ITS Concept of Operations* defines telecommunications between various RTMCs, between RTMCs and their VTMCs, and finally, during evacuations, between RTMCs and the SEOC in Tallahassee. The video transmission to the SEOC can be accomplished when FDOT completes the communications infrastructure from the RTMC to Tallahassee. Until this infrastructure is complete, the SEOC could view video snap shots from the RTMC web server.

The FDOT has a continuing telecommunications design project to extend the Ethernet protocol to and from all RTMCs and VTMCs. Therefore, workstations at any TMC, with the correct logon qualification, may access the local RTMC database and execute commands for the field devices and camera controls. Each client workstation will have direct TCP/IP Oracle drivers that will allow direct update and review of the RTMC Oracle database. An interface to a Center-to Center Communications function is to be provided by the Statewide Transportation Management Center Software Library System.

The design and specification of Center-to-Center (C2C) communications will be accomplished through a separate contract with the Florida Telecommunications General Consultant (TGC). The interface between the TMC software and the C2C software is subject to technical discussions between the STMCSLS contractor and the TGC, however it is intended that C2C communications be provided or acquired software drivers by TGC and to be used by the TMC software when needed. The STMCSLS contractor shall provide plug-in for C2C communications An interface control document will be developed to manage the Center-to-Center interface. The TGC and the STMCSLS contractor will jointly develop this interface and its documentation.

- S021   The Statewide Transportation Management Center Software Library System shall support center-to-center communications through the normal command/control functions, the status update of field devices, web server switching to another RTMC, incident data review as an output from the data distributor, and the GUI display from the ARCView software or Map Objects.

3.17 Center to FDOT Central Office Communications

The FDOT Office of Information Systems (OIS) operates as a utility serving the various clients within FDOT. The OIS currently receives data from the FDOT TranStat Office that overlays this data for various GIS purposes.

3.17.1 Archive Data

There are currently no specific requirements to archive TMC data for delivery to FDOT's OIS. Users of the TMC data will be prepared to define views of the database for the purpose of display on remote workstations and for archiving of the data.

- SS004A   The system support archiving function shall support archiving as an export to common delimited form.

The OIS has viewers to look at the data and will be responsible for the database insertion.

 3.17.2   Real-Time Video / Data

- TV005S   The Statewide Transportation Management Center Software Library System shall be capable of routing a number (that is to be determined) of video frames per second over the FDOT network to the FDOT Central Office.

The Central Office supports T1 lines from the district offices to the Burns Building where the T1 lines are aggregated to partial T3 lines.

3.17.3 Geographic Information System (GIS) Interface with Arc Info

For the purpose of displaying map data for each TMC and to deliver data to the GIS within the Central Office, the Oracle/ARCInfo approach is acceptable to OIS.

3.18 Emergency Evacuation Support

- S023   The Statewide Transportation Management Center Software Library System shall provide an evacuation coordination subsystem to provide for management of traffic during evacuations.

- EC001 The evacuation coordination subsystem shall provide the capability to efficiently manage an evacuation and provide evacuees with information they need during the evacuation, as well as the reentry.

- EC002 The evacuation coordination subsystem shall consist of five (5) major functions: (a) evacuation guidance, (b) evacuation travel information, (c) evacuation traffic management, (d) evacuation planning support and, (e) resource sharing.

- EC001G The evacuation guidance component shall provide basic information to assist potential evacuees in determining whether evacuation is necessary.

Once the decision is made to evacuate, the evacuation guidance component will also assist evacuees in the determination of destinations, routes to shelters, and other lodging options. This function will also provide guidance for returning to evacuated areas, information regarding clean-up, and other pertinent information to be distributed from federal, state, and local agencies.

- EC002G The evacuation guidance component shall be accessible to users from multiple distributed locations, including, but not limited to, (a) homes, (b) media, (c) public buildings, (d) evacuation shelters, (e) other evacuation destinations, (f) rest areas along evacuation routes, (g) hotels, (h) restaurants, (i) airports and other mode terminals, and (j) wireless devices.

- EC003G The evacuation guidance component shall provide shelter-in-place information if evacuation is not necessary.

- EC004G The evacuation guidance component shall provide a list and graphical depictions of mandatory and voluntary evacuation zones and the categories of people to be evacuated in each zone.

- EC005G The evacuation guidance component shall provide a list of alternative evacuation destinations upon request and shall provide:
    - o Alternative evacuation destinations based on historical evaluation of the services available at the destinations;
    - o Alternative evacuation destinations based on current and forecasted conditions at the destinations;
    - o Alternative evacuation destinations based on current and forecasted availability of services at destinations and along the routes to these destinations;
    - o Alternative evacuation destinations based on traveler-specified parameters including the general location of the destinations and the desired services; and

o   Alternative evacuation destinations based on the current and forecasted conditions on evacuation routes.

- EC006G The evacuation guidance component shall provide recommended evacuation and reentry route(s) for user-selected evacuation origin and destination pairs based on:
  o   An evaluation of historical operational characteristics of the alternative routes;
  o   Real-time and forecasted route conditions; and
  o   Traveler-specified route parameters.

- EC007G The evacuation guidance component shall provide the recommended evacuation and reentry start time for user-selected evacuation origin and destination pairs based on:
  o   The travel time required for the trip, given existing and forecasted conditions on those routes;
  o   Capability of the evacuation network to handle evacuation demands based on a historical evaluation of the network and current and future network conditions;
  o   Existing and forecasted conditions at evacuation origins;
  o   Existing and forecasted conditions at evacuation destinations; and
  o   Evaluation of the reentry time to ensure the safety and security of travelers and their properties.

- EC008G The evacuation guidance component shall provide information regarding evacuation shelters in areas specified by users. The information shall provide:
  o   Locations of evacuation shelters;
  o   Times during which evacuation shelters are in operation:
  o   Occupancy levels at evacuation shelters; and
  o   Available facilities at evacuation shelters, including those shelters that will accommodate people with special needs, such as pets, disabilities, and the elderly.

- EC003   The evacuation coordination subsystem shall provide an evacuation travel information function.

The evacuation travel information function will benefit evacuees in planning their evacuation trip once that decision has been made. The evacuation travel information function shall allow travelers to change course during the trip based on route and destination conditions.

- EC001E The evacuation travel information function shall provide the capability for users to access information from multiple distributed locations, including,

but not limited to, (a) homes, (b) vehicles, (c) rest areas along evacuation routes, (c) evacuation shelters, (d) hotels, (e) restaurants, (i) airports and other mode terminals, and (j) wireless devices.

- EC002E   The evacuation travel information function shall provide information about traffic conditions on evacuation routes and shall provide:
  o   Current speed/travel time on evacuation routes;
  o   An estimate of future speed/travel time on evacuation routes, taking into consideration current evacuation decisions and traveler behavior;
  o   Information regarding incident conditions on evacuation routes;
  o   Real-time road, bridge and lane closure information; and
  o   A list of roads that should be avoided due to hazardous conditions, such as flooding, malfunctioning traffic signals, debris and falling objects.

- EC003E   The evacuation travel information function shall provide the current and forecast weather conditions for evacuation origins, destinations and routes.

- EC004E   The evacuation travel information function shall provide information regarding transportation modes including buses, airlines, trains and ships. Specifically, the evaluation travel information function shall provide:
  o   Information regarding the availability of transportation mode services; and
  o   Arrival and departure information, including locations, for those services available.

- EC005E   The evacuation travel information function shall provide general evacuation guidance information to travelers, including guidance/tips for trip preparation, trip duration, and trip return.

- EC006E   The evacuation travel information function shall provide information regarding lodging available along evacuation routes and at evacuation destinations.

- EC007E   The evacuation travel information function shall provide the capability for travelers to request and receive information regarding lodging, including (a) room availability, (b) facilities, (c) conditions, and (d) pricing information.

- EC008E   The evaluation travel information function shall provide information regarding services available along evacuation routes, at evacuation origins, and at evacuation destinations. The evaluation travel information function shall provide:
  o   Real-time information relating to (a) the conditions, (b) status, and (c) availability of traveler services described in this section;

    o Capabilities for travelers to request and receive information regarding restaurants and stores, including (a) hours of operation and any changes to these hours, (b) availability of special items (such as water, non-perishable foods, wood, and batteries), and (c) pricing information;

    o Capabilities for travelers to request and receive information regarding local hospitals and other medical services;

    o Capabilities for travelers to request and receive information regarding gas stations, including (a) location, (b) operation status, (c) pricing information, and (d) the expected waiting time; and

    o Information regarding rest areas and telephone and restroom availability.

- EC009E The evaluation travel information function shall provide information regarding school and office closures.

- EC004 The evacuation coordination subsystem will provide an evacuation traffic management function.

The evacuation traffic management function will assist evacuation coordination personnel in managing evacuation operations on the transportation network.

- EC001E The evacuation traffic management function shall have a real-time data collection process to assist in the selection of evacuation strategies and to monitor the operations of the strategies selected.

- EC002E The evacuation traffic management function shall have a demand forecasting function that takes into consideration current traffic flows, current and historical evacuation trends, the size of the area to be evacuated, and expected human responses.

- EC003E The evacuation traffic management function shall include a strategy selection function that maximizes efficiency during evacuation and reentry operations. The strategy shall:
  o Integrate the control of freeways and surface streets;
  o Consider traffic movement over the entire evacuation network;
  o Be responsive to current demand as well as the forecasted demand;
  o Optimize the movement of emergency and law enforcement vehicles;
  o Allow easy access of emergency and law enforcement vehicles to traffic on evacuation routes;
  o Consider the operation of the access to and from the evacuation routes;
  o Consider the impacts to local traffic along evacuation routes;
  o Consider the time available for evacuation, time required for evacuation, and time required for implementing the evacuation strategy;

  - o Consider the availability of the resources required for the evacuation strategy;
  - o Consider the severity of the expected disaster and the size of the area affected by the disaster; and
  - o Consider the feasibility of using transit and school bus fleets during mandatory evacuations.

- EC004E The evacuation traffic management function shall provide the control of devices as required by the evacuation management plan, including: (a) traffic signals, (b) DMSs, (c) ramp meters, (d) reversible lane signs, (e) turning restriction signs, (f) road closure devices, (g) lane closure devices, (h) HAR, (i) Traveler Information Radio Network ™ (TiRN™), and (j) shoulder-use signs.

- EC005E The evacuation traffic management function shall provide the operator with the capability to manually override the system's automatic control.

- EC006E The evacuation traffic management function shall have an incident management function for evacuation routes.

- EC007E The evacuation traffic management function shall have the capability to eliminate tolls upon command.

- EC008E The evacuation traffic management function shall have a lane reversal management function that shall be able to collect real-time data for traffic moving in all traveling lanes, with and without lane reversal and shall have archiving capabilities.

- EC005 The evacuation coordination subsystem shall provide an evacuation planning support function.

The evacuation planning support function will support the evacuation planning process by providing information, current and historical, to emergency management planning personnel.

- EC001P The evacuation planning support function shall provide archived evacuation data, such as traffic flows, travel speed, vehicle occupancy, road closures, network geometry, traveler behavior, travel origins, travel destinations and evacuation traffic management strategies.

- EC002P The evacuation planning support function shall support the development of regional and multi-regional evacuation plans.

- EC003P The evacuation planning support function shall assist in identifying required modifications to transportation network geometry to accommodate evacuation strategies.

- EC004P The evacuation planning support function shall assist in defining the required resources for evacuation strategies.

- EC006 The evacuation coordination subsystem shall provide a resource sharing function.

This function shall allow information and resource sharing between agencies involved in the evacuation including transportation, emergency management, law enforcement and other emergency service agencies.

- EC001R The resource sharing function shall allow information sharing between agencies and shall:
  o Facilitate information sharing between various agencies at local, state, and federal levels;
  o Provide communication capabilities among personnel of the agencies involved in the evacuation and between these personnel and the agency centers;
  o Provide coordination and information sharing between agencies from all states affected by the evacuation;
  o Provide information to assist evacuation management personnel in making evacuation decisions; and
  o Provide information to assist evacuation management personnel in making decisions regarding shelter operations.

- EC002R The resource sharing function shall assist evacuation management personnel in making decisions regarding deployment of resources and sharing of resources based on existing and forecast demand for these resources and shall:
  o Identify the resources required for the current and forecasted evacuation scenarios;
  o Identify the resources required to implement alternative evacuation management strategies;
  o Identify the resource deployment stages, in time and space, for each evacuation scenario; and
  o Assist local, state, and multi-state agencies in sharing resources between agencies.

3.19 Inventory and Maintenance

- S022   The Statewide Transportation Management Center Software Library System shall be provided with an interface to a software system that tracks the inventory of all ITS equipment and the status of equipment repair(s) and maintenance (i.e., life-cycle asset management software system).

Registering and tracking of resources should be automated as much as possible, preferably through the use of a bar code reader for logging and tracking of devices with software that supports the classification of the equipment as failed, in repair, being installed, recorded mean time between failures of the equipment, the current location, etc.

3.19.1 Inventory

- IM001   The inventory/maintenance software shall provide a GUI display screen for the operator to add/edit/delete inventory equipment information. The equipment information shall at a minimum include:
  - o Type identification and description;
  - o Model identification and description;
  - o Manufacturer information;
  - o Serial number;
  - o Firmware version;
  - o Location description;
  - o Date installed;
  - o Status (inventory/installed/repair);
  - o Location geographic reference; and
  - o Quantity by type identification on hand.

- IM002   The inventory/maintenance software database shall index by equipment type for the purpose of reporting and updating the inventory.

- IM003   The inventory/maintenance software shall provide a GUI for the operator to add/edit/delete vendor information. The vendor information shall at a minimum include the following:
  - o Vendor name;
  - o Vendor contact;
  - o Address information including city, state, and zip code;
  - o Telephone and facsimile numbers; and
  - o Web address for purchase.

- IM001D   The vendor name shall be referenced by the equipment type identification.

- IM002D   The workstation operator shall be capable of viewing and printing the complete vendor table or the vendors according to a specific type identification.

- IM003D   The inventory/maintenance software shall maintain warehouse locations, repair shop locations, and installation locations, with a GUI screen to add/edit/delete such locations.

The equipment will initially be assigned to a location and the operator may transfer equipment between locations.

- IM004D   History of the equipment transfer and its inventory status shall be maintained and reported via GUI to the workstation operator or printed.

- IM005D   The equipment status shall be:
  o   In inventory;
  o   Installed; or
  o   In repair/test.

- IM001R   Reports shall be provided by type identification for all equipment according to equipment status.

- IM002R   All printed reports of the inventory software shall be selected via a GUI menu.

3.19.2 Repair Maintenance

- IM004   The inventory/maintenance software shall provide the operator the capability to record the status of equipment that has failed and is in the process of being repaired.

- IM006D The inventory/maintenance software shall support statusing of the equipment being tracked as follows:
  o Failed at site;
  o At repair depot;
  o In repair at depot;
  o In testing at depot; and
  o In inventory.

    - IM005 The inventory/maintenance software shall contain repair information on the equipment to include the dates of failure and repair, the repair technician, the time to repair, parts utilized by part number and comments.

    - IM006 The inventory/maintenance software shall maintain a history of the equipment repairs and may be reported via GUI to the operator or may be printed.

    - IM007 The repair status of a specific piece of equipment shall be displayed to the operator.

3.20 Documentation

The *Statewide Transportation Management Center Software Library System: Scope of Services* (hereinafter referred to as the *Scope of Services*) requires the Contract Vendor to develop and require the use of a standard set of document formats for all ITS software development projects. Review of the software engineering life-cycle demonstrates that only 20 percent (20%) of a product's life-cycle cost is spent in the development phase. It is the intention of FDOT to own the source code and have sufficient training and documentation to be able to maintain the source code, thereby avoiding reliance on the developer of the software for future changes.

- S024 The Statewide Transportation Management Center Software Library System shall be provided with a complete documentation package that shall include, but not be limited to, detailed functional and interface descriptions, user/operator manuals, software standards manuals, software test plans and procedures, and all other documentation required to complete the Statewide Transportation Management Center Software Library System project.

3.21 Reliability and Responsiveness

The Statewide Transportation Management Center Software Library System will be reliable and be able to support operations for 24 hours a day, seven (7) days a week (LOS 5). Reliability includes responsiveness to real-time events that require operator action.

- S028   The FDOT Statewide Transportation Management Center Software Library System shall provide reliable service that is responsive to real-time needs.

If the TMC software detects a specific, predefined condition or event, it will expect an operator response within a pre-programmed amount of time that can be changed by the system supervisor. If the response to an alert or alarm notification is not received within a specific amount of time (default will be 30 seconds), the executive handler will notify the people on a pre-programmed list through a primary and secondary means of communications. The first person notified will be the operator who is logged into the workstation where the alarm or alert is displayed and primary means of notification will be through pager.

- EX008   The Statewide Transportation Management Center Software Library System shall provide intelligent software that presents a list of recommended responses in time ordered sequence to different event conditions to the workstation operator.

- EX003R Event notifications including alarms shall be sent to a configurable list of people through a primary and secondary contact medium including electronic mail, telephone, and pager. The contact list shall be tailored to the event or alarm.

The executive handler will also present a list of actions for the operator to take in response to a specific event or alarm condition. The list of actions will be interactive and be tailored to the specific event so that when an operator responds to an action, the software will present the next step to be taken. If people are to be notified manually, the software will present the contact numbers for the operator to use.

- WS001A The operator workstation shall display a list of actions to be taken in response to specific events that require TMC operator response and can be checked off as they are completed.

- WS002A The list of actions to be taken in response to a specific event detected by the TMC software shall be interactive and shall tailor itself to the specific situation. For example, if a major traffic incident is detected on a limited-access facility, the operator at a workstation at the RTMC that has responsibility for that sector would be presented with a list in time ordered

sequence of who to notify, the proper contact number(s) or other appropriate response. As each step is completed, the software shall highlight the next step.

4.   Quality Assurance

- S025   All hardware and software units, elements, components, or subsystems shall be tested to verify they meet the specified requirements prior to statewide deployment.

4.1   Responsibility for Tests

Unless otherwise specified in the contract, the Contract Vendor is responsible for all inspections and tests to ensure that all requirements as specified herein are met. Except as otherwise specified, the supplier may utilize their own facilities or any other facilities acceptable to FDOT.

4.2   System Test Philosophy

Verification that the Statewide Transportation Management Center Software Library System meets its requirements will be done as the system is integrated using milestone demonstrations of key functions and with a final system end-to-end acceptance test. There will be a number of integration cases that make up the integration testing; the exact number will depend on negotiations with the Contract Vendor. The Contract Vendor will develop a detailed test plan and test procedures following the general testing guidelines provided herein.

4.2.1   Quality Conformance Inspections

Verification that each requirement has been met shall be accomplished using any one of four test methods that are: inspection of the end item (I), analysis of test results (A), demonstration of functions (D) and a test of specific performance capabilities (T).

- **Inspections –** There are two levels/types of inspections applicable to the testing. The first type of inspection is related to the requirements of Section 3 of this specification, which are verified as part of in-process manufacturing inspections or tests. This relates particularly to the specific data that is utilized within final acceptance test analysis to determine if the requirements in Section 3 of this Requirements Specification are met. Examples would be Contract Vendor certification that environmental testing has been accomplished and what the results were. The acceptance test procedures will list all such inspections or certifications even when previously accomplished. The inspection or certification records will be available for review during the acceptance testing. The second type of inspection is the review and/or inspection of the end item, including its drawings and characteristics, during the actual performance of the acceptance test.

- **Analysis –** Analysis is an element of verification in the form of a statistical study of previously collected data resulting in calculated data that is intended to verify a requirement when an examination, test, or demonstration cannot feasibly be used to verify the requirement. Such data, collected during a tightly controlled test setup, may be composed of a compilation of acceptance test data, design solutions, or data derived from lower-level tests. Satisfaction of the requirement is performed by statistical analysis of the test data. An example is a verification of a mean time between failure requirement based on data collected during system integration and testing.

- **Demonstration –** Demonstration is an element of verification that differs from testing in that it verifies only the specific situation demonstrated but not the total requirement. Demonstration is used in lieu of testing where system parameters are not sufficiently controllable to provide a test that verifies the stated requirement explicitly. In such cases, performance within the stated requirements will be demonstrated for the specific case or cases. The capability to conform to the requirement must be inferred from the successful completion of the specific demonstration. An example would be the demonstration of the ability for more than one workstation operator to view the same CCTV live video image.

- **Testing –** Testing is an element of verification denoting the determination of the properties and characteristics of equipment (or components thereof) by technical means, including functional operation and the application of established test principles and procedures. The analysis of data derived from a test is an integral part of this verification element and should not be confused with analysis. An example would be the verification that data is received at 115,000 bits per second.

4.2.2 System Acceptance Test

This formal acceptance test will be conducted after successful completion of the integration cases. The system acceptance test will verify that all system functional requirements are met by a complete, integrated system. Integration case testing involves small quantities of equipment whereas system acceptance testing involves the entire Statewide Transportation Management Center Software Library System. Prior to conducting system acceptance testing, the Contract Vendor will complete the installation and integration of the TMC software on the Statewide Transportation Management Center Software Library System test bed at a FDOT facility, complete and deliver the documentation, and conduct training.

4.3 Test Plans and Test Procedures

- QA001   The Statewide Transportation Management Center Software Library System shall be provided with test plans and test procedures for integration cases and the system acceptance test to ensure that each test is comprehensive and verifies all the features of the function to be tested.

During the development of test plans and test procedures for application software, special emphasis shall be placed on comprehensively testing each function and feature, checking error conditions, and documenting all simulation techniques used. The test plans and test procedures shall be modular to allow individual test segments to be repeated as needed.

The test plans and test procedures together shall provide a two-step description of each test. The test plans shall provide a high-level functional summary of the methods used for verifying each feature of the hardware, software, and firmware being tested. The test procedures shall detail the step-by-step activities associated with each test. All test plans and test procedures shall be submitted to FDOT for approval.

4.3.1 Test Plans

The test plans for integration cases and the final system acceptance tests will be submitted to FDOT for approval before the development of test procedures. No formal testing will take place before the applicable test procedure is approved.

- QA001P The following information shall be included in the test plan:
    - o An implementation plan and detailed schedule (PERT and GANTT Microsoft Word format);
    - o Record-keeping procedures and forms;
    - o Procedures for monitoring, correcting, and retesting variances;
    - o Procedures for controlling and documenting all changes made to the Statewide Transportation Management Center Software Library System after the start of testing;
    - o Block diagram(s) of the hardware test configuration, including Contract Vendor and FDOT supplied equipment, external communications channels, and any test or simulation hardware;
    - o A list of individual tests to be performed, the purpose of each test segment, and the appropriate functional design specification reference describing the feature being tested;
    - o Identification of special hardware or software tools or test equipment to be used during the test;
    - o Techniques and scenarios used to simulate ultimate system sizings, especially during the peak loading tests;

o   Copies of any certified test data (i.e., environmental data) to be used in lieu of testing; and
o   Alpha and beta test plans (as appropriate)

4.3.2 Test Procedures

Test procedures will be submitted to FDOT for approval prior to the commencement of formal testing. Formal testing will not commence without approved test procedures.

- QA002P Each test procedure shall list the objective of the testing and the specific TMC software system requirement(s) that are being verified along with pass/fail criteria for each.

Each integration case may consist of many tests, each with a separate test procedure. It is the FDOT's goal to group as many requirements as possible into a single test to reduce the test time and the need to provide FDOT resources in support of the testing at the expense of on-going operations. The objective of any test procedure is to provide sufficient detail to the person running the test so that the test can be conducted repeatedly with the same results given the same inputs.

- QA003P Test procedures shall include the following items:
    - o Function(s) to be tested;
    - o Purpose of each test segment;
    - o Set-up and conditions for testing including ambient conditions;
    - o Step-by-step procedures to be followed;
    - o Pass/Fail criteria for each requirement tested including measurement tolerances;
    - o All inputs and expected result outputs for each test segment; and
    - o Descriptions of all simulation tools and techniques used during the test.

It is understood by FDOT that the process of writing good test procedures involves a trial and error phase where draft procedures are tried out on the equipment and the results analyzed. This trial and error period results in changes to draft procedures and changes to the equipment to make it conform to the specifications. The Contract Vendor is expected to submit the test procedure for review and approval only after the test procedure executes reliably. It may be to the Contract Vendor's advantage for FDOT to review an early draft of the test procedure to spot any problems with assumed FDOT resource availability or support and to achieve consensus with FDOT that the proposed test procedure will verify the requirements tested.

Formal testing involves the use of the FDOT-approved test procedure and at least one FDOT technical representative to witness the testing. No deviation from the written test procedure shall be permitted without approval from the FDOT representative. Any changes to the approved test procedure to accommodate unforeseen events during the time of testing shall be documented in a copy of the master test procedure. Both the FDOT representative and the Contract Vendor's test director shall initial the change.

Immediately following the conclusion of each test, the FDOT representative and the Contract Vendor's test director shall meet to agree on the results observed and recorded during the testing. This will form the basis for the conclusions reported in the test report.

4.3.3 Test Reports

- QA002 All Statewide Transportation Management Center Software Library System test results, notes, and observations shall be maintained in both hard copy and softcopy.

The Contract Vendor will maintain complete records of all test results during all stages of testing.

- QA001R The test records shall be keyed to the steps enumerated in the test procedures and reported in the test report for each integration case.

A single test report may be prepared to address a number of tests.

- QA002R The following items shall be included in the test records:
  - Test names and paragraph numbers;
  - Dates;
  - Test locations;
  - Test specimen serial numbers or other identification;
  - Additional equipment used;
  - Test engineer's name;
  - Start and stop times;
  - Log of events;
  - Observed test results, including specified computer printouts, photographs, and plots, as applicable, that will be attached to the data sheets;
  - Description of test anomalies (as applicable);
  - Recommendations for resolution of any test anomalies;
  - Provision for comments by FDOT's representative; and
  - A copy of the master test procedure

FDOT shall review and approve each test report.

4.3.4 Rejection and Retest Criteria

Failure to meet the test requirements shall be considered a test failure. The failure to meet a particular requirement within a test case may not preclude passing other requirements that may be unrelated to the failure but that are verified by the same test case.

If a test failure occurs, FDOT management will be notified within one (1) business day of the failure occurrence. Testing will continue where possible, at the discretion of the Contract Vendor's test director, in order to maintain the schedule. A recommendation on how to resolve a test failure shall be proposed to FDOT management within ten (10) calendar days of the occurrence of the failure through a variance report issued jointly by the Contract Vendor's test director and FDOT's test representative. FDOT will respond with a decision regarding the recommendation within ten (10) working days of receipt of the recommendation. If a corrective action is implemented, only those test steps required to validate the corrective action shall be repeated.

Loss of test data due to test equipment or instrumentation failure or due to test operator error may require repeating that portion of the test in which the deficiency occurred. Testing may be continued after correction of the deficiency. Retesting due to this type of malfunction will only be required when a loss of test results prohibits the determination of conformance of the system to the test objectives. All test discrepancies shall be assumed to be a system failure until proven otherwise and all records shall contain notifications accordingly.

4.3.5 Test Variances

FDOT personnel shall prepare variance reports each requirement that failed testing as documented in a test report. The Contract Vendor is expected to make recommendations in the test report on how to correct the failure and FDOT will approve or disapprove the alternatives proposed by the Contract Vendor.

The Contract Vendor will maintain and periodically distribute a variance summary that lists the variance number, functional identification, variance class, and current status of each variance. The frequency of the distribution of the variance summary shall be based on testing activity.

Each variance report includes a complete description of the variance, including the following items:

- A unique sequential identifying number assigned to the variance by FDOT;
- The dates and times the variance was first discovered;
- Variance classification (i.e., Class 1, 2, or 3);
- Variance status (i.e., open, closed, or in-process);
- Appropriate references to relevant test procedures, requirements, or design documentation;
- A description of the conditions at the time the variance was detected; and
- Identification of the Contract Vendor and FDOT personnel witnessing the test.

Each variance will be assigned to one of the following three classes, depending on its severity and impact on the testing. Variances will be classified by FDOT in concurrence with the Contract Vendor's project manager.

- **Class 1 –** A Class 1 variance is a severe variance that prevents, invalidates, or significantly impairs further testing or operation in revenue service. Further testing will stop for immediate evaluation and correction by the Contract Vendor.

- **Class 2 –** A Class 2 variance is a significant variance that may impact operation in revenue service. Testing that is independent of the variance will continue and the variance will be corrected at the earliest opportunity and retested.

- **Class 3 –** A Class 3 variance is a minor or isolated variance that does not impact or invalidate further testing or impact operation in revenue service. Testing will continue and the variance will be corrected and tested at a mutually agreed upon time.

4.3.6   Retest Limits

A test shall be repeated a maximum number of two (2) times before it will be determined that the deficiency cannot be corrected [a total of three (3) attempts]. Test failures outside of the control of the manufacturer or supplier of the equipment shall not be counted (i.e., failure of the special test equipment). At that point, the impact of the failure will be assessed by the Contract Vendor's test director and presented to FDOT or their designated representative for resolution. Resolution may consist of consideration by the manufacturer or supplier of the function or an alternative implementation may be agreed upon. Other options would be pursued in negotiations between the Contract Vendor and FDOT.

4.4   Test Requirements

Each test case consists of a set of functional tests that are designed to verify multiple system-level requirements to maximize the usefulness of each test. Likewise, a single system requirement may be verified by multiple tests to increase the test sample size. The requirements validated by each test are listed at the beginning of each test description and presented in a matrix form in Table 4.2, Requirements Traceability Verification Matrix, shown in Section 4.4.2.

In these test cases, requirements may be verified either by demonstration (D), test (T), inspection (I), or analysis (A). Some requirements, such as communications reliability, may be verified by the analysis of data collected over a combination of these tests.

The test configurations, specific test objectives, applicable system requirements, test scenario descriptions, equipment/personnel requirements, and test measurement requirements shall be provided in the individual test procedures.

4.4.1 Requirements Nomenclature

For ease in managing and analyzing requirements, a combination of alphabet prefixes and suffixes identify each requirement and are shown in Table 4.1.

Prefix characters denote a system or specific subsystem requirement and suffix characters denote a specific function within the subsystem. The prefix "S" denotes a system-level requirement. A two-letter prefix denotes a subsystem requirement. For example, the letters "DB" refers to the database subsystem, "EX" refers to the executive handler subsystem, and "DD" refers to the data distribution subsystem.

Table 4.1 – Requirements Identification Codes

Prefix/Suffix Identification	Requirements
Sxxx	**System requirements**
DBxxx	Database subsystem requirements
DBxxxA	Database abstraction layer component requirements
DBxxxR	Database recovery component requirements
DBxxxT	Database user table component requirements
DDxxxx	Data distribution subsystem requirements
DMxxx	DMS subsystem requirements
DMxxxD	DMS database component requirements
ECxxx	Evacuation coordination requirements
ECxxxE	Evacuation coordination travel time function requirements
ECxxxG	Evacuation coordination guidance function requirements
ECxxxP	Evacuation coordination planning function requirements
EcxxxR	Evacuation coordination resource sharing function requirements
EXxxx	Executive handler subsystem requirements
EXxxxD	Executive handler display component requirements
EXxxxF	Executive handler failure recovery component requirements
EXxxxL	Executive handler error logging component requirements
EXxxxM	Executive handler monitoring component requirements
EXxxxR	Executive handler reporting component requirements
GSxxx	GIS requirements
IDxxx	Incident detection function requirements

Table 4.1 (Continued)

Prefix/Suffix Identification	Requirements
IDxxxW	Incident detection function workstation requirements
IMxxx	Inventory/Maintenance subsystem requirements
IMxxxD	Inventory/Maintenance data and display component requirements
IMxxxR	Inventory/Maintenance reporting component requirements
NWxxx	Network security requirements
PAxxx	Public access subsystem requirements
PAxxxU	Public access user function requirements
QAxxx	Quality assurance requirements
QAxxxP	Quality assurance integration and test plans/procedure requirements
QAxxxR	Quality assurance integration and test reporting requirements
RWxxx	Road weather subsystem requirements
RWxxxD	Road weather data component requirements
RWxxxU	Road weather user interface requirements
SSxxx	System support subsystem requirements
SSxxxA	Support system archiving component requirements
SSxxxB	Support system backup component requirements
TBxxx	Trail blazer sign subsystem interface requirements
TDxxx	Traffic detector subsystem requirements
TDxxxD	Traffic detector device driver component requirements
TMxxx	Incident management function requirements
TMxxxI	Incident management information requirements
TMxxxR	Incident management response function requirements
TMxxxW	Incident management workstation requirements
TVxxx	CCTV subsystem requirements
TVxxxD	CCTV device drivers component requirements
TVxxxS	CCTV switching/routing component requirements
UTxxx	GUI subsystem requirements
VWxxx	Video wall subsystem requirements
VWxxxC	Video wall control component requirements
WSxxx	Workstation security subsystem requirements

4.4.2 Requirements Traceability Verification Matrix

Not all requirements have lower level requirements. The level of requirement decomposition depends on the level of detail required to specify a function or performance unambiguously. All of the applicable requirement identifications are listed in the Requirements Traceability Matrix in Table 4.2. Specific requirements are listed in Section 3 of this *Specification*.

Table 4.2 – Software System Requirements Traceability Verification Matrix

Paragraph	User	System	Subsystem	Component	Summary
2.4	A001				The Statewide Transportation Management Center Software Library System shall provide software for incident detection.
2.4	A002				The Statewide Transportation Management Center Software Library System shall provide software for video surveillance.
3.8	A002	S015			The Statewide Transportation Management Center Software Library System shall interface with CCTV cameras.
3.8.1	A002	S015	TV001		The CCTV function shall provide device drivers for the following camera types:
3.8.2	A002	S015	TV001	TV001D	Device drivers shall be capable of controlling pan/tilt/zoom.
3.8.2	A002	S015	TV001	TV002D	The CCTV system shall be able to control traditional pan/tilt units as well as the dome camera systems.
3.8.2	A002	S015	TV001	TV003D	The NTCIP standard shall be utilized for camera control and communications.
3.8.2	A002	S015	TV001	TV004D	Alternates to the NTCIP standard shall be device drivers.
3.8.2	A002	S015	TV001	TV005D	Drivers shall, at a minimum, provide functionality equal to that provided via the NTCIP standard.
3.8.2	A002	S015	TV001	TV006D	The Statewide Transportation Management Center Software Library System shall communicate with CCTV cameras using serial communications.
3.8.2	A002	S015	TV001	TV007D	The CCTV range objects shall be implemented in the device drivers.
3.8.2	A002	S015	TV001	TV008D	The device drivers shall contain the CCTV timeout objects.
3.8.2	A002	S015	TV001	TV009D	The device drivers shall contain CCTV preset objects.
3.8.2	A002	S015	TV001	TV010D	The device drivers shall contain CCTV system feature control objects.
3.8.2	A002	S015	TV001	TV011D	The device drivers shall contain the following CCTV alarm objects.
3.8.2	A002	S015	TV001	TV012D	The device drivers shall contain the following CCTV discrete input objects.

Table 4.2 (Continued)

Paragraph	User	System	Subsystem	Component	Summary
3.8.2	A002	S015	TV001	TV013D	The device drivers shall contain the following CCTV discrete output objects.
3.8.2	A002	S015	TV001	TV014D	The device drivers shall contain the CCTV zone parameters.
3.8.2	A002	S015	TV001	TV015D	The device drivers shall contain the CCTV label objects.
3.8.2	A002	S015	TV001	TV016D	The device drivers shall contain CCTV on-screen camera menu objects.
3.8.3	A002	S015	TV002		The CCTV function shall incorporate technologies for the transmission of video and data between field hardware, subsystems, TMCs, and additional remote locations.
3.8.4	A002	S015	TV002	TV001S	The CCTV function shall route any video signal to any user within a TMC.
3.8.4	A002	S015	TV002	TV002S	The CCTV function shall allow the same video image to be viewed simultaneously.
3.8.4	A002	S015	TV002	TV003S	The CCTV function shall allow only one workstation at a time to control a CCTV unit.
3.8.5	A002	S015	TV002	TV004S	A monitor shall be able to display multiple video images from multiple sources.
3.17.2	A002	S015	TV002	TV005S	The Statewide Transportation Management Center Software Library System shall route video frames over the FDOT network to the FDOT Central Office.
2.4	A003				The Statewide Transportation Management Center Software Library System shall provide software for management and operations.
2.4	A004				The Statewide Transportation Management Center Software Library System shall provide software for the collection and dissemination of data from the ATIS.
3.4	A004	S010			The Statewide Transportation Management Center Software Library System shall provide a function to distribute data in real-time.
3.4	A004	S010	DD001		The data distribution function shall be capable of retrieving real-time data from the database.
3.4	A004	S010	DD002		The user shall be capable of selecting the data to be displayed by the data distribution function.
3.0	A004	S018			The Statewide Transportation Management Center Software Library System shall interface with FDOT legacy device drivers.
3.15	A004	S020			The Statewide Transportation Management Center Software Library System shall provide a web server for dissemination of TMC information.
3.15	A004	S020	PA001		The web server shall capture and publish video from analog and digital video devices.
3.15	A004	S020	PA002		The web server shall provide secure access to system control functions.

Table 4.2 (Continued)

Paragraph	User	System	Subsystem	Component	Summary
3.15	A004	S020	PA003		A browser-based control mechanism shall be provided.
3.15	A004	S020	PA003	PA001U	A selectable menu of cameras shall be provided to the user.
3.15	A004	S020	PA004		The web server shall provide a map showing the congestion levels.
2.4	A005				The Statewide Transportation Management Center Software Library System shall provide software for detection of road weather conditions.
3.12	A005	S017			The Statewide Transportation Management Center Software Library System shall use RWIS data
3.12.1	A005	S017	RW001		The NTCIP standard for ESSs shall be used.
3.12.1	A005	S017	RW002		The NTCIP standard for ESSs shall be used.
3.12.1	A005	S017	RW003		Alternates to the NTCIP standard shall be device drivers.
3.12.1	A005	S017	RW004		The RWIS interface function shall provide object-oriented data elements.
3.12.1	A005	S017	RW004	RW001D	The RWIS interface function shall provide the global object definitions.
3.12.2	A005	S017	RW004	RW002D	The RWIS interface function shall provide object definitions for ESSs.
3.12.3	A005	S017	RW005		The RWIS user interface shall be a software application within the Statewide Transportation Management Center Software Library System.
3.12.3	A005	S017	RW005	RW001U	The RWIS data shall be accessible from anywhere in the Statewide Transportation Management Center Software Library System.
3.12.3	A005	S017	RW005	RW002U	The RWIS user interface shall provide data fields relative to each RWIS field unit.
2.4	A006				The Statewide Transportation Management Center Software Library System shall provide software for the identification of construction work zones.
2.4	A007				The Statewide Transportation Management Center Software Library System shall provide software for traffic data collection.
3.10	A007	S016			The Statewide Transportation Management Center Software Library System shall use real-time archived data from traffic monitors.
3.10.1	A007	S016	TD001		The Statewide Transportation Management Center Software Library System shall be capable of collecting traffic data from a variety of sensors.
3.10.2	A007	S016	TD002		The Statewide Transportation Management Center Software Library System shall be able to receive and process traffic data in time intervals.
3.10.2	A007	S016	TD003		The NTCIP standard for the transportation sensor system shall be utilized.

Table 4.2 (Continued)

Paragraph	User	System	Subsystem	Component	Summary
3.10.2	A007	S016	TD004		The Statewide Transportation Management Center Software Library System shall use serial and/or Ethernet for device communications.
3.10.2	A007	S016	TD005		The transportation sensor system shall prefer device drivers that provide the same NTCIP functionality.
3.10.3	A007	S016	TD006		Device drivers shall contain the following categories of data elements.
3.10.3	A007	S016	TD006	TD001D	The transportation sensor system device drivers shall contain the setup data elements.
3.10.3	A007	S016	TD006	TD002D	The transportation sensor system device drivers shall contain the control data elements.
3.10.3	A007	S016	TD006	TD003D	The transportation sensor system device drivers shall contain the loop detector data elements.
2.4	A008				The Statewide Transportation Management Center Software Library System shall provide software for real-time video display and control.
3.0	A008	S005			Each RTMC shall collect, assess, and manage real-time traffic data and video.
3.9.4	A008	S005	ID001		The Statewide Transportation Management Center Software Library System shall support automatic detection of an incident or congestion.
3.9.4	A008	S005	ID002		The Statewide Transportation Management Center Software Library System shall be able to view a congestion report for all roadway segments.
3.9.4	A008	S005	ID003		A workstation operator shall have the ability to view an incident or congestion raw data.
3.9.4	A008	S005	ID003	ID001W	Displays shall result from a comparison between all possible sources of data.
3.9.4	A008	S005	ID003	ID002W	The report shall include graphical displays
3.9.4	A008	S005	ID004		A workstation operator shall have the ability to enter manual incident or congestion information.
3.9.4	A008	S005	ID005		The Statewide Transportation Management Center Software Library System shall have a map display of the current incident or congestion for each segment.
3.7	A008	S013			The Statewide Transportation Management Center Software Library System shall provide software to control a video wall.
3.7.1	A008	S013	VW001		The video wall function shall include a video wall and wall controller.
3.7.1	A008	S013	VW003		The video wall function shall support the addition of extra "cubes" to enlarge the total display.
3.7.1	A008	S013	VW004		All display characteristics of the video wall shall be accessible via a user interface.
3.7.1	A008	S013	VW005		Any workstation operator that can see the video wall shall be able to control it.

Table 4.2 (Continued)

Paragraph	User	System	Subsystem	Component	Summary
3.7.1	A008	S013	VW006		The video wall function shall provide control capabilities.
3.7.2	A008	S013	VW007		The video wall software shall be controlled through RS-232 and/or RS-422 data formats.
2.4	A009				The Statewide Transportation Management Center Software Library System shall provide software for video verification.
2.4	A010				The Statewide Transportation Management Center Software Library System shall provide software for Incident data archiving.
2.4	A011				The Statewide Transportation Management Center Software Library System shall provide software for coordination.
2.4	A012				The Statewide Transportation Management Center Software Library System shall provide software for the management, dispatch, and coordination of Road Rangers Service Patrols.
2.4	A013				The Statewide Transportation Management Center Software Library System shall provide maintenance and management of ITS field devices and communications infrastructures.
3.2	A013	S008			The Statewide Transportation Management Center Software Library System shall have an executive function.
3.2	A013	S008	EX001		The Statewide Transportation Management Center Software Library System's shall provide executive handler functions.
3.2.1	A013	S008	EX002		The executive handler system shall process control requirements.
3.2.1	A013	S008	EX003		The executive handler shall have the capability to read scheduled process controls.
3.2.1	A013	S008	EX004		The executive handler shall also have the capability to group dependencies.
3.2.1	A013	S008	EX004	EX001F	The executive handler shall start processes in the same order that they originally started.
3.2.1	A013	S008	EX004	EX002F	The executive handler shall have safeguards.
3.2.1	A013	S008	EX005		The executive handler shall have the ability to initialize individual components.
3.2.2	A013	S008	EX006		The executive handler shall also monitor, report, and display status.
3.2.2	A013	S008	EX006	EX001D	The executive handler shall provide a hierarchal view.
3.2.2	A013	S008	EX006	EX001M	The executive handler shall monitor key data.
3.2.2	A013	S008	EX006	EX001R	Reporting functions shall include the ability to send event notifications.
3.2.2	A013	S008	EX006	EX002M	Data collected shall be capable of being stored in the database.

Table 4.2 (Continued)

Paragraph	User	System	Subsystem	Component	Summary
3.2.2	A013	S008	EX006	EX002R	All event notifications shall be stored in the central database.
3.21	A013	S008	EX006	EX003R	Event notifications including alarms shall be sent to a configurable list of people.
3.2.3	A013	S008	EX007		The executive handler shall log error conditions as they are detected.
3.2.3	A013	S008	EX007	EX001L	Data logging for an error condition shall be able to be adjusted in real-time.
3.2.3	A013	S008	EX007	EX002L	Separate log files shall be used for each application monitored.
3.2.3	A013	S008	EX007	EX003L	Each log file message shall be time stamped and shall include the origin of the message.
3.2.4	A013	S008	EX009		The Statewide Transportation Management Center Software Library System general device driver requirements include communication to field devices through FDOT networks.
3.19	A013	S022			The Statewide Transportation Management Center Software Library System shall provide an interface to maintenance and inventory tracking software.
3.19.1	A013	S022	IM001		The inventory/maintenance software shall provide a GUI display screen.
3.19.1	A013	S022	IM002		The inventory/maintenance software database shall index by equipment type.
3.19.1	A013	S022	IM003		The IMS shall provide a GUI for the operator to add/edit/delete vendor information
3.19.1	A013	S022	IM003	IM001D	The vendor name shall be referenced by the equipment type identification.
3.19.1	A013	S022	IM003	IM001R	Reports shall be provided by type identification according to equipment status.
3.19.1	A013	S022	IM003	IM002D	A workstation user shall be able to view and print the complete vendor table.
3.19.1	A013	S022	IM003	IM002R	Reports shall be provided by type identification according to equipment status.
3.19.1	A013	S022	IM003	IM003D	The inventory/maintenance software shall maintain status and location data.
3.19.1	A013	S022	IM003	IM004D	History of the equipment transfer and its inventory status shall be maintained.
3.19.1	A013	S022	IM003	IM005D	Equipment status categories shall be defined.
3.19.2	A013	S022	IM004		The IMS shall provide the capability to the operator to record the status of equipment.
3.19.2	A013	S022	IM004	IM006D	The status of the equipment shall be tracked.
3.19.2	A013	S022	IM005		The inventory/maintenance software shall contain repair information.
3.19.2	A013	S022	IM006		The IMS shall maintain a history of equipment repairs.
3.19.2	A013	S022	IM007		The IMS shall maintain a status of equipment repairs.

Table 4.2 (Continued)

Paragraph	User	System	Subsystem	Component	Summary
4.0	A013	S025			The Statewide Transportation Management Center Software Library System shall contain quality assurance requirements.
4.3	A013	S025	QA001		The Statewide Transportation Management Center Software Library System shall be provided with test plans and procedures.
4.3.1	A013	S025	QA001	QA001P	The Statewide Transportation Management Center Software Library System shall contain test plans.
4.3.2	A013	S025	QA001	QA002P	Each test procedure shall list the objective of the test.
4.3.2	A013	S025	QA001	QA003P	The Statewide Transportation Management Center Software Library System shall contain test procedures.
4.3.3	A013	S025	QA002		The Statewide Transportation Management Center Software Library System test results, notes, and observations shall be maintained.
4.3.3	A013	S025	QA002	QA001R	The test records shall be keyed to the steps enumerated in the test procedures.
4.3.3	A013	S025	QA002	QA002R	The Statewide Transportation Management Center Software Library System shall include test records.
3.0	A013	S027			The Statewide Transportation Management Center Software Library System shall adhere to open architecture standards.
2.4	A014				The Statewide Transportation Management Center Software Library System shall provide configuration management of the traffic management software.
2.4	A015				The Statewide Transportation Management Center Software Library System shall provide software for coordination with freeway incident management team(s).
2.4	A016				The Statewide Transportation Management Center Software Library System shall support the motorist aid call box system.
2.4	A017				The Statewide Transportation Management Center Software Library System shall monitor system performance.
3.3.3	A017	S009			The Statewide Transportation Management Center Software Library System shall support the creation of reports by restricted knowledgeable users.
3.3.3	A017	S009	WS007		The workstation shall have a report utility for printing.
2.4	A018				The Statewide Transportation Management Center Software Library System shall provide software for traffic and delay prediction.
2.4	A019				The Statewide Transportation Management Center Software Library System shall provide software for traffic data archiving and central data warehousing.

Table 4.2 (Continued)

Paragraph	User	System	Subsystem	Component	Summary
3.0	A019	S002			The Statewide Transportation Management Center Software Library System shall consist of public domain/sector software wherever possible.
3.0	A019	S003			The Statewide Transportation Management Center Software Library System shall use centric database architectures.
3.1	A019	S003	DB001		A modular abstraction layer shall be incorporated in the Statewide Transportation Management Center Software Library System.
3.1	A019	S003	DB001	DB001A	The abstraction layer shall be modular.
3.1.1	A019	S003	DB002		The database shall be capable of accessing non-compliant SQL databases.
3.1.1	A019	S003	DB002	DB002A	The abstraction layer shall be implemented as an SQL proxy.
3.1.1	A019	S003	DB002	DB003A	The transaction layer shall be a virtual layer for standards compliant applications.
3.3.1	A019	S003	DB004		An option shall be provided for FDOT to store historical data.
3.3	A019	S003	UT001		Tables shall exist in the database for entry of workstation users and parameters.
3.3.1	A019	S003	UT002		The Statewide Transportation Management Center Software Library System shall allow users with proper security permissions to update the database.
3.3.1	A019	S003	UT003		Data collected from device communications software shall update the database tables.
3.3.2	A019	S003	UT004		The Statewide Transportation Management Center Software Library System shall support the specification of field device parameters.
3.3.2	A019	S003	UT005		Table parameters shall provide for the current status of such devices.
3.1.1	A019	S007			Clustering and disaster recovery shall be provided for in the Statewide Transportation Management Center Software Library System.
3.1.1	A019	S007	DB003		The recovery point objective shall be less than one-tenth of a percent (0 0.1%).
3.1.1	A019	S007	DB003	DB001R	The recovery time objective shall be less than one (1) hour.
3.6	A019	S012			The Statewide Transportation Management Center Software Library System shall provide workstation security functions.
3.6	A019	S012	WS001		The workstation shall provide the capability to assign specific users and groups to categories.
3.6	A019	S012	WS002		The workstation shall use encrypted passwords.
3.6.1	A019	S012	WS003		Each user added to a group shall inherit the functionality of the group.
3.6.1	A019	S012	WS004		Users shall be able to log into other workstations if a workstation fails.

Table 4.2 (Continued)

Paragraph	User	System	Subsystem	Component	Summary
3.6.2	A019	S012	WS005		Only system administrators shall have access to the operating system security.
3.6.3	A019	S012	WS006		Only system administrators shall have access to the operating system security.
3.7.3	A019	S014			The Statewide Transportation Management Center Software Library System shall provide a GIS software interface.
3.7.3	A019	S014	GS001		The Statewide Transportation Management Center Software Library System GIS function shall use the ArcView/MapObjects software client.
3.7.3	A019	S014	GS002		Data shall be viewable from PTMCs, VTMCs, RTMCs, and the FDOT Central Office.
3.7.3	A019	S014	GS003		The ArcView/MapObjects software client shall be a Microsoft Windows executable program.
3.7.3	A019	S014	GS004		The Statewide Transportation Management Center Software Library System shall support a TCP/IP connection at a minimum speed of 1.544 million bits per second.
3.14	A019	S014	GS005		The GIS map shall display an icon indicating call box activation.
3.14	A019	S014	GS006		The Statewide Transportation Management Center Software Library System workstation user shall be able to cycle the call box icon on and off.
3.13	A019	S019			The Statewide Transportation Management Center Software Library System shall provide an interface to DMSs.
3.13	A019	S019	DM001		DMS device drivers shall be capable of sending all messages from the DMS database.
3.13	A019	S019	DM002		The DMS software shall implement a message sign database.
3.13	A019	S019	DM002	DM001D	The DMS database shall contain a list and images of acceptable and unacceptable messages.
3.13	A019	S019	DM002	DM002D	The DMS database shall contain internal operating parameters and internal messages.
3.13.1	A019	S019	DM002	DM003D	The DMS device driver shall communicate with the DMS.
3.13	A019	S019	TB001		The Statewide Transportation Management Center Software Library System shall provide an interface to trail blazer signs.
3.20	A019	S024			The Statewide Transportation Management Center Software Library System shall provide the documentation requirements package.
3.6	A019	S026			The Statewide Transportation Management Center Software Library System shall provide network security.
3.6	A019	S026	NW001		The firewall shall provide EAL-4+ certification employing a "default deny" policy.

Table 4.2 (Continued)

Paragraph	User	System	Subsystem	Component	Summary
3.6	A019	S026	NW002		A multi-layer DMZ model shall be used to segment traffic.
2.4	A020				The Statewide Transportation Management Center Software Library System shall provide software for center-to-center communications.
3.0	A020	S006			The Statewide Transportation Management Center Software Library System shall provide each TMC with the software tools to reduce congestion and delays.
3.11	A020	S006	TM001		The Statewide Transportation Management Center Software Library System shall provide each TMC with the software tools to reduce congestion and delays.
3.11	A020	S006	TM002		The incident management subsystem shall acquire data from the vehicle detection function.
3.11.1	A020	S006	TM003		The workstation GUI screens shall support the entry of the exact location and direction of travel.
3.11.1	A020	S006	TM003	TM003W	The incident management workstation function shall support operator entry of the incident type
3.11.2	A020	S006	TM004		The incident management function shall distribute video feeds, traffic flow, incident information, and traffic event data.
3.11.2	A020	S006	TM004	TM001I	The incident management function shall format information for distribution to dissemination media.
3.11.3	A020	S006	TM005		The incident management function shall provide the operator with personnel lists and contact numbers.
3.11.3	A020	S006	TM005	TM001R	The incident management response function shall provide the operator with personnel lists and contact numbers.
3.11.3	A020	S006	TM005	TM002R	The incident management response function shall support CAD for the Road Rangers Service Patrols.
3.11.3	A020	S006	TM005	TM003R	The incident management response function shall support the cataloging of incident management teams and resources.
3.11.3	A020	S006	TM005	TM004R	The incident management response function shall provide a quick click interface to GIS maps.
3.11.4	A020	S006	TM006		The incident management function shall provide workstation operators with GUI screens.
3.11.5	A020	S006	TM007		The incident management function shall support RTMCs with the traffic control procedures.
3.11.5	A020	S006	TM007	TM005R	The incident management response function shall recommend a set of DMS locations and messages.
3.11.5	A020	S006	TM007	TM006R	The incident management response function shall recommend a set of HAR messages.

Table 4.2 (Continued)

Paragraph	User	System	Subsystem	Component	Summary
3.11.5	A020	S006	TM007	TM007R	The incident management response function shall display, on the GIS map, recommended alternate routes.
3.11.5	A020	S006	TM007	TM008R	The incident management response function shall be able to select alternate maps,
3.11.5	A020	S006	TM007	TM009R	The incident management response function shall communicate with detour message signs.
3.11.5	A020	S006	TM007	TM010R	The incident management response function shall support a hierarchy of traffic management activities.
3.11.6	A020	S006	TM008		The incident management function shall support the clearance process.
3.11.6	A020	S006	TM008	TM011R	The incident management response function shall catalog FDOT resources.
3.16	A020	S021			The Statewide Transportation Management Center Software Library System hall provide center-to-center communications interfaces.
2.4	A021				The Statewide Transportation Management Center Software Library System shall support operations during disasters.
3.18	A021	S023			The Statewide Transportation Management Center Software Library System shall provide an evacuation coordination subsystem.
3.18	A021	S023	EC001		The evacuation coordination subsystem shall provide the capability to efficiently manage evacuations.
3.18	A021	S023	EC002		The evacuation coordination subsystem shall consist of five major functions.
3.18	A021	S023	EC002	EC001G	The evacuation guidance component shall provide basic information to assist potential evacuees.
3.18	A021	S023	EC002	EC002G	The evacuation guidance component shall be accessible to users from multiple distribution locations.
3.18	A021	S023	EC002	EC003G	The evacuation guidance component shall provide shelter-in-place information if evacuation is not necessary.
3.18	A021	S023	EC002	EC004G	The evacuation guidance component shall provide a list and graphical depiction of mandatory and voluntary evacuation zones.
3.18	A021	S023	EC002	EC005G	The evacuation guidance component shall provide a list of alternative evacuation destinations.
3.18	A021	S023	EC002	EC006G	The evacuation guidance component shall provide recommended evacuation and reentry route(s).
3.18	A021	S023	EC002	EC007G	The evacuation guidance component shall provide the recommended evacuation and reentry start times.
3.18	A021	S023	EC002	EC008G	The evacuation guidance component shall provide information regarding evacuation shelters.

Table 4.2 (Continued)

Paragraph	User	System	Subsystem	Component	Summary
3.18	A021	S023	EC003		The evacuation coordination subsystem shall provide an evacuation travel information function.
3.18	A021	S023	EC003	EC001E	The evacuation travel information function shall provide the capability for users to access from multiple distributed locations.
3.18	A021	S023	EC003	EC002E	The evacuation travel information function shall provide information about traffic conditions.
3.18	A021	S023	EC003	EC003E	The evacuation travel information function shall provide the current and forecasted weather conditions for evacuations.
3.18	A021	S023	EC003	EC004E	The evacuation travel information function shall provide information regarding transportation modes.
3.18	A021	S023	EC003	EC005E	The evacuation travel information function shall provide general evacuation guidance information.
3.18	A021	S023	EC003	EC006E	The evacuation travel information function shall provide information regarding available lodging.
3.18	A021	S023	EC003	EC007E	The evacuation travel information function shall provide the capability for travelers to request and receive information.
3.18	A021	S023	EC003	EC008E	The evacuation travel information function shall provide information regarding services available along evacuation routes.
3.18	A021	S023	EC003	EC009E	The evacuation travel information function shall provide information regarding school and office closures.
3.18	A021	S023	EC004		The evacuation coordination subsystem will provide an evacuation traffic management function.
3.18	A021	S023	EC004	EC001E	The evacuation traffic management function shall have a real-time data collection process.
3.18	A021	S023	EC004	EC002E	The evacuation traffic management function shall have a demand forecasting function.
3.18	A021	S023	EC004	EC003E	The evacuation traffic management function shall include a strategy selection function that maximizes efficiency.
3.18	A021	S023	EC004	EC004E	The evacuation traffic management function shall provide the control of devices as required by the evacuation management plan.
3.18	A021	S023	EC004	EC005E	The evacuation traffic management function shall provide the operator with the capability to manually override the system's automatic controls.
3.18	A021	S023	EC004	EC006E	The evacuation traffic management function shall have an incident management function for evacuation routes.
3.18	A021	S023	EC004	EC007E	The evacuation traffic management function shall have the capability to eliminate tolls upon command.

Table 4.2 (Continued)

Paragraph	User	System	Subsystem	Component	Summary
3.18	A021	S023	EC004	EC008E	The evacuation traffic management function shall have a lane reversal management function.
3.18	A021	S023	EC005		The evacuation coordination subsystem shall provide an evacuation planning support function.
3.18	A021	S023	EC005	EC001P	The evacuation planning support function shall provide archived evacuation data.
3.18	A021	S023	EC005	EC002P	The evacuation planning support function shall support the development of regional and multi-regional evacuation plans.
3.18	A021	S023	EC005	EC003P	The evacuation planning support function shall assist in identifying required modifications to transportation network geometries.
3.18	A021	S023	EC005	EC004P	The evacuation planning support function shall assist in defining the required resources for evacuation strategies.
3.18	A021	S023	EC006		The evacuation coordination subsystem shall provide a resource sharing function.
3.18	A021	S023	EC006	EC001R	The resource sharing function shall allow information sharing between agencies.
3.18	A021	S023	EC006	EC002R	The resource sharing function shall assist evacuation management personnel.
2.4	A022				The Statewide Transportation Management Center Software Library System shall provide software for diversion route list maintenance.
2.4	A023				The Statewide Transportation Management Center Software Library System shall provide software for management of lane or road closures.
2.4	A024				RTMCs shall have primary responsibility for managing traffic.
3.0	A024	S001			The Statewide Transportation Management Center Software Library System shall provide for a centrally managed set of software modules.
2.4	A025				STMCs and VTMCs shall be capable of fulfilling RTMC responsibilities.
2.4	A026				In major urban areas, TMC services shall be provided 24 hours, seven (7) days a week (LOS 5).
3.21	A026	S028			The Statewide Transportation Management Center Software Library System shall be responsive to real-time needs.
3.21	A026	S028	EX008		The Statewide Transportation Management Center Software Library System shall use artificial intelligence.
3.21	A026	S028	EX008	WS001A	The Workstation shall present applicable procedures in response to events.
3.21	A026	S028	EX008	WS002A	The response procedures list shall be interactive.
2.4	A027				In non-major urban areas, TMC services shall be provided 16 hours per day (LOS 4).

Table 4.2 (Continued)

Paragraph	User	System	Subsystem	Component	Summary
2.4	A028				The Statewide Transportation Management Center Software Library System shall be designed to accommodate future capabilities.
2.4	A029				There shall be four (4) categories of TMCs in the State of Florida.
3.0	A029	S004			The Statewide Transportation Management Center Software Library System shall be flexible and expandable.
2.4	A030				The RTMC shall serve as the hub for command and control operations.
3.5	A030	S011			The Statewide Transportation Management Center Software Library System shall support the automation of system support tasks.
3.5.1	A030	S011	SS001		The system support function shall store the history information about the status of a job.
3.5.1	A030	S011	SS002		All other jobs shall be documented and be able to used as operating system schedulers.
3.5.3	A030	S011	SS002	SS001A	The system support function archiving component shall provide for automated archiving of data.
3.5.2	A030	S011	SS002	SS001B	The system support function shall provide automated backup.
3.5.3	A030	S011	SS002	SS002A	At a minimum, the system support function shall archive incident history data, device status logs, detector data, and system logs.
3.5.2	A030	S011	SS002	SS002B	The backup component shall shutdown the database
3.5.3	A030	S011	SS002	SS003A	Archived data shall comply with standards set by FDOT's TranStat Office.
3.17.1	A030	S011	SS002	SS004A	The system support archiving function shall support archiving as an export to common delimited form.
2.4	A031				The PTMC shall support work zone management

There are 2,364 requirements in the Statewide Transportation Management Center Software Library System requirements database. Table 4.1 presented a list of those requirements sorted in ascending order from user needs, system, subsystem, and component requirements. A brief summary of each requirement is provided along with the specification paragraph number where the requirement is found. Note that the summary is not the requirement and is to be used only as a memory aid in remembering the full text of the requirement. Incorporation of A-level requirements traced to system level is provided in Table 4.3.

The NITSA traceability to the Statewide Transportation Management Center Software Library System requirements is shown in Table 4.3. Version 4.0 of the NITSA database was used. Up to twelve (12) user service requirements can be identified for some of the Statewide Transportation Management Center Software Library System requirements, therefore multiple user service requirement numbers are shown in the table separated by a forward slash mark. A description of each user service requirement listed can be found in Section 5.2.

Table 4.3 – ITS National ITS Architecture (NITSA) User Service Requirements Link

Statewide Transportation Management Center Software Library System Requirement	Summary	User Service Requirement Identifications
S004	The Statewide Transportation Management Software Library System shall be flexible and expandable.	1.0 / 1.6 / 1.7 / 1.8 / 5.0 / 5.3/ 7.0 / 7.1.3.2 / 7.1.5.2.5 / 7.1.6
S021	The Statewide Transportation Management Center Software Library System shall provide for center-to-center communications interfaces.	1.0 / 1.5 / 1.6 / 1.7 / 5.0 / 5.3/ 4.0 / 7.0 / 8.0
A002	The Statewide Transportation Management Center Software Library System shall provide software for video surveillance.	1.0 / 1.7 / 1.7.0 / 1.7.2 / 1.7.3 / 1.7.4 / 2.0 / 2.2 / 2.4 / 8.0 / 8.1
A003	The Statewide Transportation Management Center Software Library System shall provide software for management and operations.	1.0 / 1.5 / 1.6 / 1.7 / 2.0 / 4.0 / 5.0 / 5.3 / 7.0 / 8.0
A004	The Statewide Transportation Management Center Software Library System shall provide software for the Collection and dissemination of ATIS information.	1.0 / 1.1 / 1.2 / 1.5 / 1.6 / 1.8 / 2.0 / 4.0 / 8.0
A005	The Statewide Transportation Management Center Software Library System shall provide software for the detection of road weather conditions.	1.0 / 1.1 / 1.2 / 1.5 / 1.6 / 1.7 / 1.8 / 2.1 / 4.5 / 5.0 / 7.0 / 8.0
A006	The Statewide Transportation Management Center Software Library System shall provide software for the identification of construction work zones.	1.0 / 1.6 / 1.7 / 1.8 / 8.0
A007	The Statewide Transportation Management Center Software Library System shall provide software for traffic data.	1.0 / 1.1 / 1.2 / 1.5 /1.6 /1.7 / 1.8 / 2.0 / 4.0 / 4.5 / 5.0 / 8.0
A008	The Statewide Transportation Management Center Software Library System shall provide software for real-time video display and control.	1.0 / 1.5 / 1.6 / 1.7 / 1.8 / 2.0 / 4.5 / 5.0 / 5.3 / 8.0

Statewide Transportation Management Center Software Library System Requirement	Summary	User Service Requirement Identifications
A009	The Statewide Transportation Management Center Software Library System shall provide software for video verification.	1.0 / 1.2 / 1.5 / 1.6 / 1.7 / 1.8 / 2.0 / 2.2 / 5.0 / 5.2 / 5.3 / 8.0

Table 4.3 (Continued)

Statewide Transportation Management Center Software Library System Requirement	Summary	User Service Requirement Identifications
A010	The Statewide Transportation Management Center Software Library System shall provide software for Incident data archiving.	1.0 / 1.6 / 1.7 / 4.5 / 5.0 / 7.0 /7.1
A011	The Statewide Transportation Management Center Software Library System shall provide software for coordination.	1.0 / 1.7 / 4.5 / 5.0 / 5.1 / 5.2 /5.3
A012	The Statewide Transportation Management Center Software Library System shall provide software for the management, dispatch, and coordination of Road Rangers Service Patrols.	1.0 / 1.7 / 5.0 / 5.2
A013	The Statewide Transportation Management Center Software Library System shall provide system maintenance and management of ITS field devices and communications infrastructure	1.0 / 1.5 / 1.6 / 1.7 / 4.0 / 4.5 / 5.0 / 5.3 / 7.0 / 8.0
A014	Configuration management of traffic management software shall be provided by the operating TMC.	
A015	The Statewide Transportation Management Center Software Library System shall provide software for coordination with a freeway incident management team.	1.0 / 1.6 / 1.7 / 4.5 / 5.0 / 5.3 / 8.0
A018	The Statewide Transportation Management Center Software Library System shall provide software for traffic and delay prediction.	1.0 / 1.1 / 1.2 / 1.6 / 1.7 / 1.8
A020	The Statewide Transportation Management Center Software Library System shall provide software for center-to-center communications.	1.0 / 1.6 / 1.7 / 2.0 / 4.5 / 5.0 / 5.2 / 5.3 / 7.0 / 7.1
A024	RTMCs shall have primary responsibility for managing traffic.	1.0 / 1.6 / 4.0 / 8.1
A025	STMCs and VTMCs shall be capable of fulfilling RTMC responsibilities.	1.0 / 1.6 / 4.0 / 8.1

Table 4.3 (Continued)

Statewide Transportation Management Center Software Library System Requirement	Summary	User Service Requirement Identifications
A026	In major urban areas, TMC services shall be provided 24 hours, seven (7) days a week (LOS 5).	1.0 / 1.6 / 1.7 / 1.8 / 7.0
A027	In non-major urban areas, TMC services shall be provided 16 hours per day (LOS 4).	1.0 / 1.6 / 1.7 / 1.8 / 7.0
A029	There shall be four (4) categories of TMCs in the State of Florida.	1.0 / 1.6 / 1.7 / 1.8 / 5.0 / 5.3 / 7.0
A030	The RTMC shall serve as the hub for command and control operations.	1.0 / 1.6 / 1.7 / 1.8 / 5.0 / 5.3 / 7.0
A031	The PTMC shall support work zone management.	1.0 / 1.6 / 7.0 / 8.0
S010	The Statewide Transportation Management Center Software Library System shall provide a function to distribute data in real-time.	1.1.2.1.1 / 1.1.2.1.2 / 1.1.2.1.3 / 1.1.2.1.4 / 1.1.2.1.5 / 1.1.2.1.6 / 1.1.2.1.7 / 1.1.2.1.8 / 1.6.3.1 / 1.6.3.2 / 7.1.2.5 / 7.1.2.6
S028	The Statewide Transportation Management Center Software Library System shall be responsive to real-time needs.	1.1.2.1.1 / 1.6.3.1 / 1.6.3.2
UT005	Table parameters shall provide for the current status of such devices	1.1.2.1.2 / 7.1.3.1.1 / 7.1.3.1.10 / 7.1.3.1.11 / 7.1.3.1.5 / 7.1.3.1.6 / 7.1.3.1.7 / 7.1.3.1.8 / 7.1.3.1.9
S005	Each RTMC shall collect, assess, and manage real-time traffic data and video.	1.1.3.1.3 / 7.1.3.7 / 1.6.2.1 / 1.6.3.1 / 1.6.3.2 / 2.1.1.2.1 / 2.1.2.1.1 / 2.2.0 / 2.2.1.1.1 / 2.2.2.1 / 7.1.2.5 / 7.1.2.6
ID001	The Statewide Transportation Management Center Software Library System shall support automatic detection of an incident or congestion.	1.1.3.1.3 / 7.1.3.7 / 1.6.2.1 / 1.6.3.1 / 1.6.3.2 / 2.1.1.2.1 / 2.1.2.1.1 / 2.2.0 / 2.2.1.1.1 / 2.2.2.1 / 7.1.2.5 / 7.1.2.6
ID002	The Statewide Transportation Management Center Software Library System shall be able to view a congestion report for all roadway segments.	1.1.3.1.3 / 7.1.3.7 / 1.6.2.1 / 1.6.3.1 / 1.6.3.2 / 2.1.1.2.1 / 2.1.2.1.1 / 2.2.0 / 2.2.1.1.1 / 2.2.2.1 / 7.1.2.5 / 7.1.2.6
ID003	A workstation operator shall have the ability to view an incident or congestion raw data.	1.1.3.1.3 / 7.1.3.7 / 1.6.2.1 / 1.6.3.1 / 1.6.3.2 / 2.1.1.2.1 / 2.1.2.1.1 / 2.2.0 / 2.2.1.1.1 / 2.2.2.1 / 7.1.2.5 / 7.1.2.6
ID004	A workstation operator shall have the ability to enter manual incident or congestion information.	1.1.3.1.3 / 7.1.3.7 / 1.6.2.1 / 1.6.3.1 / 1.6.3.2 / 2.1.1.2.1 / 2.1.2.1.1 / 2.2.0 / 2.2.1.1.1 / 2.2.2.1 / 7.1.2.5 / 7.1.2.6
ID005	The Statewide Transportation Management Center Software Library System shall have a map display of the current incident or congestion for each segment.	1.1.3.1.3 / 7.1.3.7 / 1.6.2.1 / 1.6.3.1 / 1.6.3.2 / 2.1.1.2.1 / 2.1.2.1.1 / 2.2.0 / 2.2.1.1.1 / 2.2.2.1 / 7.1.2.5 / 7.1.2.6

Table 4.3 (Continued)

Statewide Transportation Management Center Software Library System Requirement	Summary	User Service Requirement Identifications
ID001W	Displays shall result from a comparison between all possible sources of data.	1.1.3.1.3 / 7.1.3.7 / 1.6.2.1 / 1.6.3.1 / 1.6.3.2 / 2.1.1.2.1 / 2.1.2.1.1 / 2.2.0 / 2.2.1.1.1 / 2.2.2.1 / 7.1.2.5 / 7.1.2.6
ID002W	The report shall include graphical displays.	1.1.3.1.3 / 7.1.3.7 / 1.6.2.1 / 1.6.3.1 / 1.6.3.2 / 2.1.1.2.1 / 2.1.2.1.1 / 2.2.0 / 2.2.1.1.1 / 2.2.2.1 / 7.1.2.5 / 7.1.2.6
A022	The Statewide Transportation Management Center Software Library System shall provide software for the maintenance of a list of diversion routes.	1.3 / 1.6 / 1.7 / 2.2 / 4.5 / 5.0 / 5.2 / 5.3 / 7.0 /7.1
A028	The Statewide Transportation Management Center Software Library System shall be designed to accommodate future capabilities.	1.3 / 1.5 / 1.7 / 5.0 / 4.0 / 7.0
A016	The Statewide Transportation Management Center Software Library System shall support the motorist aid call box system.	1.6 / 1.7 / 5.0 / 5.3
A023	The Statewide Transportation Management Center Software Library System shall provide software for the management of lane or road closures.	1.6 / 1.7 / 5.0 / 5.3 / 7.0 / 7.1
WS001A	A workstation shall present applicable procedures in response to events.	1.6.3.6 / 1.7.0
S017	The Statewide Transportation Management Center Software Library System shall use RWIS data.	1.7.1.2.1 / 7.1.3.1.7 / 8.1.1.3.1
RW002D	The RWIS interface function shall provide object definitions.	1.7.1.2.1 / 7.1.3.1.7 / 8.1.1.3.1
S013	The Statewide Transportation Management Center Software Library System shall provide software to control a video wall.	1.7.1.2.3 / 1.6 / 1.7 / 5.0 / 5.3
A001	The Statewide Transportation Management Center Software Library System shall provide software for incident detection.	1.7.4 / 1.7 / 4.5 / 5.0 / 7.0 / 8.0 1.7.2.1 / 1.7.2 / 1.7.0 / 1.7.1 / 1.7.1.1 / 1.7.1.2
A021	The Statewide Transportation Management Center Software Library System shall support operations during disasters.	4.5 / 5.0 / 5.1 / 5.2 / 5.3 / 7.1
A017	The Statewide Transportation Management Center Software Library System shall monitor system performance.	7.0 / 7.1

Table 4.3 (Continued)

Statewide Transportation Management Center Software Library System Requirement	Summary	User Service Requirement Identifications
A019	The Statewide Transportation Management Center Software Library System shall provide software for traffic data archiving and central data warehousing.	7.0 / 7.1
S001	The Statewide Transportation Management Center Software Library System shall provide for a centrally managed set of software modules.	7.1.0 / 7.1.1 / 7.1.4 / 7.1.2 / 7.1.3 / 7.1.5 / 7.1.6
S002	The Statewide Transportation Management Center Software Library System shall consist of public domain/sector software wherever possible.	7.1.0 / 7.1.1 / 7.1.2 / 7.1.3 / 7.1.4 / 7.1.5 / 7.1.6
S003	The Statewide Transportation Management Center Software Library System shall use a centric database architecture.	7.1.0 / 7.1.1 / 7.1.2 / 7.1.3 / 7.1.4 / 7.1.5 / 7.1.6
S011	The Statewide Transportation Management Center Software Library System shall support the automation of system support tasks.	7.1.0 / 7.1.1 / 7.1.2 / 7.1.3 / 7.1.4 / 7.1.5 / 7.1.6
SS002A	System support information shall be archived.	7.1.0 / 7.1.1 / 7.1.2 / 7.1.3 / 7.1.4 / 7.1.5 / 7.1.6
DB004	An option shall be provided for FDOT to store historical data.	7.1.1.1 / 7.1.1.2 / 7.1.1.3 / 7.1.1.4 / 7.1.1.5 / 7.1.3.1 / 7.1.4.1 / 7.1.4.2 / 7.1.4.4 / 7.1.4.5 / 7.1.3.4 / 7.1.3.3
S015	The Statewide Transportation Management Center Software Library System shall interface with CCTV cameras.	7.1.1.1 / 7.1.2
TV001S	The CCTV function shall route any video signal to any user within a TMC.	7.1.1.1 / 7.1.2
TV002S	The CCTV function shall allow the same video image to be viewed simultaneously.	7.1.1.1 / 7.1.2
TV004S	A monitor shall be able to display multiple video images from multiple sources.	7.1.1.1 / 7.1.2
S016	The Statewide Transportation Management Center Software Library System shall use real-time/archived data from traffic monitors.	7.1.1.1 / 7.1.2 / 7.1.2.5 / 7.1.2.6 / 7.1.3.7
TD001	The Statewide Transportation Management Center Software Library System shall be capable of collecting traffic data from a variety of sensors.	7.1.1.1 / 7.1.2
TD006	The device drivers shall contain the data elements.	7.1.1.1 /
DM001	The DMS device driver shall be capable of sending all messages from the DMS database.	7.1.1.1 / 7.1.2

Table 4.3 (Continued)

Statewide Transportation Management Center Software Library System Requirement	Summary	User Service Requirement Identifications
DM002	The DMS software shall implement a message sign database.	7.1.1.1 / 7.1.2
DM001D	The DMS database shall contain a list and images of acceptable and unacceptable messages.	7.1.1.1 / 7.1.2
DM002D	The DMS database shall contain internal operating parameters and internal messages.	7.1.1.1 / 7.1.2
GS005	The GIS map shall display an icon indicating call box activation.	7.1.1.1 / 7.1.2
GS006	The Statewide Transportation Management Center Software Library System workstation user shall be able to cycle the call box icon on and off.	7.1.1.1 / 7.1.2
S022	The Statewide Transportation Management Center Software Library System shall provide an interface to maintenance and inventory tracking software.	7.1.1.1 / 7.1.2 / 7.1.2.3
IM003D	The inventory/maintenance software shall maintain status and location data.	7.1.1.1 / 7.1.2
IM004D	History of the equipment transfer and its inventory status shall be maintained.	7.1.1.1 / 7.1.2
IM001R	Reports shall be provided by type identification according to equipment status.	7.1.1.1 / 7.1.2
IM002R	Reports shall be provided by type identification according to equipment status.	7.1.1.1 / 7.1.2
S018	The Statewide Transportation Management Center Software Library System shall interface with FDOT legacy device drivers.	7.1.1.1 / 7.1.2
TB001	The Statewide Transportation Management Center Software Library System shall provide an interface to trail blazer signs.	7.1.1.1 / 7.1.2
SS001	The system support function shall store the history information about the status of a job.	7.1.1.2 / 7.1.3.8 / 7.1.4.2 / 7.1.4.3 / 7.1.4.5 / 7.1.5.2.2
SS002	All other jobs shall be documented and be able to be used as operating system schedulers.	7.1.1.2 / 7.1.3.8 / 7.1.4.2 / 7.1.4.3 / 7.1.4.5 / 7.1.5.2.2
UT002	The Statewide Transportation Management Center Software Library System shall allow users with proper security permissions to update the database.	7.1.1.4 / 7.1.1.4.1 / 7.1.6.2 / 7.1.1.4.2 / 7.1.1.4.3 / 7.1.1.4.4
SS002B	The backup component shall shutdown the database.	7.1.1.4 / 7.1.1.4.1 / 7.1.1.4.2

Table 4.3 (Continued)

Statewide Transportation Management Center Software Library System Requirement	Summary	User Service Requirement Identifications
S012	The Statewide Transportation Management Center Software Library System shall provide workstation security functions.	7.1.1.4 / 7.1.1.4.1 / 7.1.1.4.2 / 7.1.1.4.3 / 7.1.1.4.4
S026	The Statewide Transportation Management Center Software Library System shall provide network security.	7.1.1.4 / 7.1.1.4.1 / 7.1.1.4.2 / 7.1.1.4.3
WS004	Users shall be able to log into other workstations if a workstation fails.	7.1.1.4.1 / 7.1.1.4.2 / 7.1.1.4.3 / 7.1.1.4.4
S009	The Statewide Transportation Management Center Software Library System shall support the creation of reports by restricted knowledgeable users.	7.1.1.4.3 / 7.1.4.4.4 / 7.1.5.2 / 7.1.5.2.1 / 7.1.5.2.2 / 7.1.5.2.3 / 7.1.5.2.4 / 7.1.5.2.5
WS001	The workstation shall provide the capability to assign specific users and groups to categories.	7.1.1.4.3 / 7.1.1.4.4
WS002	The workstation shall use encrypted passwords.	7.1.1.4.3 / 7.1.1.4.4
WS003	Each user added to a group shall inherit the functionality of the group.	7.1.1.4.3 / 7.1.1.4.4
WS005	Only system administrators shall have access to the operating system security.	7.1.1.4.3
WS006	Only system administrators shall have access to the operating system security.	7.1.1.4.3 / 7.1.1.4.1 / 7.1.1.4.2
VW004	All display characteristics of the video wall shall be accessible via a user interface.	7.1.1.4.3 / 7.1.1.4.4
VW005	Any workstation operator that can see the video wall shall be able to control it.	7.1.1.4.4
S020	The Statewide Transportation Management Center Software Library System shall provide a web server for dissemination of TMC information.	7.1.1.4.4 / 7.1.1.5 / 7.1.5.2.1 / 7.1.6.3.2
PA004	The web server shall provide a map showing the congestion levels.	7.1.1.5 / 7.1.5.2.1 / 7.1.6.3.2
EX001D	The executive handler shall provide a hierarchal view.	7.1.2 / 7.1.3
UT001	Tables shall exist in the database for entry of workstation users and parameters.	7.1.2 / 7.1.2.1 / 7.1.2.1.1 / 7.1.2.1.2 / 7.1.2.1.3 / 7.1.2.1.4 / 7.1.2.1.5 / 7.1.2.2 / 7.1.2.3 / 7.1.2.4 / 7.1.2.5 / 7.1.2.6
UT003	Data collected from device communications software shall update the database tables.	7.1.2 / 7.1.2.1 / 7.1.2.1.1 / 7.1.2.1.2 / 7.1.2.1.3 / 7.1.2.1.4 / 7.1.2.1.5
TV001	The CCTV function shall provide device drivers for the cameras.	7.1.2

Table 4.3 (Continued)

Statewide Transportation Management Center Software Library System Requirement	Summary	User Service Requirement Identifications
TV005S	The Statewide Transportation Management Center Software Library System shall route video frames over the FDOT network to the FDOT Central Office.	7.1.2 / 7.1.1.1
IM004	The IMS shall provide the capability of the operator to record the status of equipment.	7.1.2
IM006D	The status of the equipment shall be tracked.	7.1.2
IM005	The inventory/maintenance software shall contain repair information.	7.1.2
IM006	The IMS shall maintain a history of the equipment repairs.	7.1.2
IM007	The IMS shall maintain a history of the equipment repairs	7.1.2
DB001	A modular abstraction layer shall be incorporated in the Statewide Transportation Management Center Software Library System.	7.1.2.1 / 7.1.2.2 / 7.1.2.3 / 7.1.2.4 / 7.1.2.5 / 7.1.2.6 / 7.1.3.1 / 7.1.3.2 / 7.1.3.3 / 7.1.3.4 / 7.1.3.5 / 7.1.4.2
DB001A	The abstraction layer shall be modular.	7.1.2.1 / 7.1.2.2 / 7.1.2.3 / 7.1.2.4 / 7.1.2.5 / 7.1.2.6 / 7.1.6.1 / 7.1.6.2 / 7.1.6.3 / 7.1.6.4
SS001A	The system support archiving component shall provide for automated archiving of data.	7.1.2.1.3 / 7.1.3.4 / 7.1.3.8 / 7.1.4.1 / 7.1.4.1.1 / 7.1.4.3 / 7.1.4.5 / 7.1.5.2.2 / 7.1.5.2.4
EX001	The Statewide Transportation Management Center Software Library System shall define the executive handler functions.	7.1.2.1.4 / 7.1.3.3 / 7.1.4.2
S025	The Statewide Transportation Management Center Software Library System shall define quality assurance requirements.	7.1.2.1.4 / 7.1.3.3
DD001	The data distribution function shall be capable of retrieving real-time data from the database.	7.1.2.5 / 7.1.2.6 / 7.1.3.7
TD002	The Statewide Transportation Management Center Software Library System shall be able to receive and process traffic data in time intervals.	7.1.2.5 / 7.1.2.6 / 7.1.3.7
S007	Clustering and disaster recovery shall be provided for in the TMC software.	7.1.3 / 7.1.3.1 / 7.1.3.2 / 7.1.3.3 / 7.1.3.4 / 7.1.3.5 / 7.1.3.6 / 7.1.3.7 / 7.1.3.8 / 7.1.3.9
DB003	The recovery point objective shall be less than one-tenth percent (0.1%).	7.1.3 / 7.1.3.1 / 7.1.3.2 / 7.1.3.3 / 7.1.3.4 / 7.1.3.5 / 7.1.3.6 / 7.1.3.7 / 7.1.3.8 / 7.1.3.9
UT004	The Statewide Transportation Management Center Software Library System shall support the specification of field device parameters.	7.1.3.1 / 7.1.3.1.1 / 7.1.3.1.10 / 7.1.3.1.11 / 7.1.3.1.5 / 7.1.3.1.6 / 7.1.3.1.7 / 7.1.3.1.8 / 7.1.3.1.9

Table 4.3 (Continued)

Statewide Transportation Management Center Software Library System Requirement	Summary	User Service Requirement Identifications
S014	The Statewide Transportation Management Center Software Library System shall provide a GIS software interface.	7.1.3.1.9
GS001	The Statewide Transportation Management Center Software Library System's GIS function shall use the ArcView/Map Objects software client.	7.1.3.1.9
GS002	Data shall be viewable from PTMCs, VTMCs, RTMCs, and FDOT Central Office.	7.1.3.1.9 / 7.1.2 / 7.1.6.4
SS003A	The system support archiving function shall support archiving as an export to common delimited form.	7.1.3.2 / 7.1.3.3 / 7.1.3.4 / 7.1.3.5 / 7.1.3.6 / 7.1.3.7 / 7.1.3.8 / 7.1.3.9
EX006	The executive handler shall monitor, report, and display status.	7.1.3.3 / 7.1.4.2 / 7.1.1.4 / 7.1.1.4.1 / 7.1.1.4.2 / 7.1.1.4.3 / 7.1.1.4.4
EX007	The executive handler shall log error conditions as they are detected.	7.1.3.3
EX001L	Data logging for an error condition shall be able to be adjusted in real-time.	7.1.3.3
EX002L	Separate log files shall be used for each application monitored.	7.1.3.3
EX003L	Each log file message shall be time stamped and include the origin of the message.	7.1.3.3
EX002	The executive handler system shall process control requirements.	7.1.4.2 / 7.1.3.3
EX003	The executive handler system shall have the capability to read scheduled process control.	7.1.4.2 / 7.1.3.3
EX004	The executive handler system shall also have the capability to group dependencies.	7.1.4.2 / 7.1.3.3
EX001F	The executive handler shall start processes in the same order that they were originally started.	7.1.4.2 / 7.1.3.3
EX005	The executive handler shall have the ability to initialize individual components.	7.1.4.2 / 7.1.3.3
EX002F	The executive handler shall have safeguards.	7.1.4.2 / 7.1.3.3
EX002M	Data collected shall be capable of being stored in the database.	7.1.4.2 / 7.1.1.2 / 7.1.1.3
EX002R	All event notifications shall be stored in the central database.	7.1.4.2 / 7.1.1.2 / 7.1.1.3
S008	The Statewide Transportation Management Center Software Library System shall have an executive function.	7.1.5 / 7.1.5.2 / 7.1.5.2.1 / 7.1.5.2.2 / 7.1.5.2.3 / 7.1.5.2.4 / 7.1.5.2.5 / 7.1.1.1 / 7.1.2
EX001R	Reporting functions shall include the ability to send event notifications.	7.1.5.2 / 7.1.5.2.1 / 7.1.5.2.2 / 7.1.5.2.3 / 7.1.5.2.4

Table 4.3 (Continued)

Statewide Transportation Management Center Software Library System Requirement	Summary	User Service Requirement Identifications
DD002	The user shall be capable of selecting the data to be displayed by the data distribution function.	7.1.5.2.1 / 7.1.5.2.3 / 7.1.6.3 / 7.1.6.3.1 / 7.1.6.3.2 / 7.1.6.3.3 / 7.1.6.4 / 7.1.6.4.1 / 7.1.6.4.2 / 7.1.6.4.3 / 7.1.6.4.4
DB003A	The transaction layer shall be a virtual layer for standards compliant applications.	7.1.5.2.5
EX001M	The executive handler shall monitor key data.	7.1.5.2.5
SS003A	Archived data shall comply with standards set by FDOT's TranStat Office.	7.1.5.2.5
S024	The Statewide Transportation Management Center Software Library System shall include documentation requirements.	7.1.5.2.5
GS003	The ArcView/Map Objects software client shall be a Microsoft Windows executable program.	7.1.6.1 / 7.1.6.2 / 7.1.6.3 / 7.1.6.4
DB002	The database shall be capable of accessing non-compliant SQL databases.	7.1.6.1.1 / 7.1.6.2 / 7.1.6.2.1 / 7.1.6.2.2 / 7.1.6.3.1 / 7.1.6.3.2 / 7.1.6.3.3
DB002A	The abstraction layer shall be implemented as an SQL proxy.	7.1.6.1.1 / 7.1.6.2 / 7.1.6.2.1 / 7.1.6.2.2 / 7.1.6.3.1 / 7.1.6.3.2 / 7.1.6.3.3
RW005	The RWIS user interface shall be a software application within the Statewide Transportation Management Center Software Library System.	8.1.1.3.1 / 7.1.3.1.7 / 1.7.1.2.1
RW001U	The RWIS data shall be accessible from anywhere in the Statewide Transportation Management Center Software Library System.	8.1.1.3.1 / 7.1.3.1.7 / 1.7.1.2.1
S006	The Statewide Transportation Management Center Software Library System shall provide each TMC with the software tools to reduce congestion and delays	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
IM001	The Statewide Transportation Management Center Software Library shall provide each TMC with the software tools to reduce congestion and delays.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
IM002	The incident management subsystem shall acquire data from the vehicle detection function.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
IM003	The workstation GUI screens shall support the entry of the exact location and direction of travel.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
IM003W	The incident management workstation function shall support operator entry of the incident type.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3

Table 4.3 (Continued)

Statewide Transportation Management Center Software Library System Requirement	Summary	User Service Requirement Identifications
IM004	The incident management function shall distribute video feeds, traffic flow, incident information, and traffic event data.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
IM001I	The incident management function shall format information for distribution to dissemination media.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
IM005	The incident management function shall provide the operator with personnel lists and contact numbers.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
IM001R	The incident management response function shall provide the operator with personnel lists and contact numbers.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 /1.8.2.14 / 1.8.2.3
IM002R	The incident management response function shall support CAD for the Road Rangers Service Patrols.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
IM003R	The incident management response function shall support the cataloging of incident management teams and resources.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
IM003R	The incident management response function shall provide a quick click interface to the GIS maps.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
TM006	The incident management function shall provide the workstation operators with GUI screens.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
TM007	The incident management function shall support the RTMC with the traffic control procedures.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
TM005R	The incident management response function shall recommend a set of DMS locations and messages.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
TM006R	The incident management response function shall recommend a set of HAR messages.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
TM007R	The incident management response function shall display, on the GIS map, recommended alternate routes.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
TM008R	The incident management response function shall be able to select alternate maps.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
TM009R	The incident management response function shall communicate with detour message signs.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
TM010R	The incident management response function shall support a hierarchy of traffic management activities.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3

Table 4.3 (Continued)

Statewide Transportation Management Center Software Library System Requirement	Summary	User Service Requirement Identifications
TM008	The incident management function shall support the clearance process.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3
TM0011R	The incident management response function shall contain a catalog of FDOT resources.	8.1.3.3 / 8.1.1.6.1 / 1.8.0 / 1.8.1 / 1.8.2 / 1.8.2.13 / 1.8.2.14 / 1.8.2.3

5. Notes

5.1 National ITS Architecture (NITSA) User Service Requirements

**Table 5.1 – *National ITS Architecture (NITSA)*
User Service Requirements and Descriptions**

User Service Requirements	Description
1.0	**TRAVEL AND TRAFFIC MANAGEMENT**
1.1	**PRE-TRIP TRAVEL INFORMATION**
1.1.2.1	Pre-trip travel information shall provide the latest available information on the current status of transportation services.
1.1.2.1.1	Real-time information provided by pre-trip travel information shall include the current condition of any incidents, including rural incidents such as high winds, extreme temperatures, and falling rocks.
1.1.2.1.2	Real-time information provided by pre-trip travel information shall include the current status of any accidents or incidents.
1.1.2.1.3	Real-time information provided by pre-trip travel information shall include the current condition of any road construction.
1.1.2.1.4	Real-time information provided by pre-trip travel information shall include any currently recommended alternate routes.
1.1.2.1.5	Real-time information provided by pre-trip travel information shall include the current speeds on specific routes.
1.1.2.1.6	Real-time information provided by pre-trip travel information shall include current parking conditions in key areas.
1.1.2.1.7	Real-time information provided by pre-trip travel information shall include the schedules for any current or soon to start events.
1.1.2.1.8	Real-time information provided by pre-trip travel information shall include the current weather situation.
1.1.3.1.3	Based on user specified parameters pre-trip travel information shall provide users with real-time travel conditions for time of inquiry and estimated conditions for estimated time of travel.
1.2	**EN-ROUTE DRIVER INFORMATION**
1.3	**ROUTE GUIDANCE**
1.5	**TRAVELER SERVICES INFORMATION**
1.6	**TRAFFIC CONTROL**
1.6.2.1	Traffic surveillance shall include a vehicle detection function with the capability of accurately detecting vehicles in a real-time fashion.
1.6.3.1	The device control function shall include a "real-time" traffic-adaptive control capability.
1.6.3.2	The real-time traffic-adaptive control portion of the device control function shall be an area-wide control to include several jurisdictions.
1.6.3.6	Device control shall provide the operator the capability to adaptively change system response in order to provide a response that is coordinated with other TMCs responding to incidents.

Table 5.1 (Continued)

User Service Requirements	Description
1.7	**INCIDENT MANAGEMENT**
1.7.0	ITS shall include an incident management function. Incident management will identify incidents, formulate response actions, and support initiation and ongoing coordination of those response actions. Four (4) major functions are provided that include: 1) incidents identification, 2) response formulation, 3) response implementation, and 4) prediction of hazardous conditions.
1.7.1	Incident management shall provide an incident identification function to identify incidents.
1.7.1.1	The incident identification function shall include the capability to identify predicted incidents.
1.7.1.2	The incident identification function shall include the capability to identify existing (both planned and unplanned) incidents.
1.7.1.2.1	The incident identification function shall use information from the following types of sources, where available, to identify existing incidents:
1.7.1.2.1(a)	Traffic flow sensors;
1.7.1.2.1(b)	Environmental sensors;
1.7.1.2.1(c)	Public safety sources;
1.7.1.2.1(d)	Media sources;
1.7.1.2.1(e)	Weather information sources;
1.7.1.2.1(f)	Transportation providers; and
1.7.1.2.1(g)	Travelers.
1.7.1.2.3	The incident identification function shall determine and continuously monitor the current and expected traffic flow impact of each existing incident.
1.7.2	The incident identification function shall provide a response formulation function to formulate appropriate response actions to each identified incident and revise those actions when necessary.
1.7.2.1	The response formulation function shall propose and facilitate the appropriate scheduling of those predicted incidents that can be scheduled to minimize incident potential, incident impacts, and/or the resources required for incident management.
1.7.3	The incident management subsystem shall include a response implementation function to provide the services to implement a response coordinated with all appropriate agencies.
1.7.4	The incident management subsystem shall provide the capability to predict hazardous conditions, including the time and location of hazardous conditions that may cause incidents.
1.8	**TRAVEL DEMAND MANAGEMENT**
1.8.0	ITS shall include a travel demand management function. Travel demand management will generate and communicate management and control strategies that will support and facilitate the implementation of travel demand management programs, policies, and regulations. It consists of two major functions including 1) increased efficiency of transportation systems and 2) the provision of a wide variety of mobility options.
1.8.1	Travel demand management shall include a communications function.
1.8.2	Travel demand management shall include a processing function.
1.8.2.13	The processing function's dynamically generated management and control strategies for air pollution control shall be based on factors that include, but are not limited to, the following:
1.8.2.13(a)	Sensor data;

Table 5.1 (Continued)

User Service Requirements	Description
1.8.2.13(b)	Individual vehicle monitoring; and
1.8.2.13(c)	Individual vehicle database files.
1.8.2.14	The processing function's dynamically generated management and control strategies shall include the capability to respond to the need for travelers to change modes by generating messages for variable signs that include, but are not limited to, the following:
1.8.2.14(a)	Where the mode change requests are being made;
1.8.2.14(b)	How the mode changes are requested to be made; and
1.8.2.14(c)	Why the mode changes are requested to be made.
1.8.2.3	Strategies developed by the processing function shall include the guidance for the operation of physical systems that:
1.8.2.3(a)	Monitor traffic;
1.8.2.3(b)	Inform travelers;
1.8.2.3(c)	Collect fees; and
1.8.2.3(d)	Detect traffic.
2.0	**PUBLIC TRANSPORTATION MANAGEMENT**
2.1	**PUBLIC TRANSPORTATION MANAGEMENT**
2.1.1.2.1	Provide the capability for real-time vehicle command-and-control.
2.1.2.1.1	Planning and scheduling services shall be performed off-line from stored data that were collected in real-time.
2.2	**EN-ROUTE TRANSIT INFORMATION**
2.2.0	ITS shall include an en-route transit information function. En-route transit information provides travelers with real-time transit and HOV information allowing travel alternatives to be chosen once the traveler is en-route. It consists of three (3) major functions including: 1) information distribution, 2) information receipt, and 3) information processing. This capability integrates information from different transit modes and presents it to travelers for decision-making.
2.2.1.1.1	The information network shall be able to provide users with real-time travel related information while they are traveling.
2.2.2.1	Information receipt shall provide the capability to be continuously updated with real-time information from each transit system within the local area of jurisdiction.
2.4	**PUBLIC TRAVEL SECURITY**
4.0	**COMMERCIAL VEHICLE OPERATIONS (CVO)**
4.5	**HAZARDOUS MATERIAL (HAZMAT) INCIDENT RESPONSE**
5.0	**EMERGENCY MANAGEMENT**
5.1	**EMERGENCY NOTIFICATION AND PERSONAL SECURITY**
5.2	**EMERGENCY VEHICLE MANAGEMENT**
5.3	**EVACUATION COORDINATION (Florida Specific Market Package, FLEM4)**
7.0	**INFORMATION MANAGEMENT**
7.1	**ARCHIVED DATA FUNCTION**

Table 5.1 (Continued)

User Service Requirements	Description
7.1.0	ITS shall provide an archived data function to control the archiving and distribution of ITS data. The archived data user service provides the historical data archive repositories and controls the archiving functionality for all ITS data with five (5) major functions: 1) the operational data control function to manage operations and data integrity; 2) the data import and verification function to acquire historical data from the operational data control function; 3) the automatic data historical archive function for permanently archiving the data; 4) the data warehouse distribution function, which integrates the planning, safety, operations, and research communities into ITS and processes data products for these communities; and 5) the ITS community interface function, which provides the ITS common interface to all ITS users for data products specification and retrieval. The archived data user service helps achieve the ITS information goal of unambiguous interchange and reuse of data and information throughout all functional areas.
7.1.1	The archived data function shall provide a historical data archive system for ITS data.
7.1.1.1	The historical data archive system shall include repositories of operational data received from field equipment or data collection devices.
7.1.1.2	The historical data archive system shall provide permanent historical data repositories.
7.1.1.3	The historical data archive system repositories shall include meta data and meta-attributes repositories.
7.1.1.4	The historical data archive system shall provide ITS data system security.
7.1.1.4.1	The historical data archive system shall be capable of employing security solutions.
7.1.1.4.2	The historical data archive system shall be capable of preventing data loss.
7.1.1.4.3	The historical data archive system shall be capable of preventing unauthorized access to ITS data repositories
7.1.1.4.4	The historical data archive system shall be capable of providing a secure interface for online support of the ITS user interface.
7.1.1.5	The historical data archive system shall be capable of supporting online analytical functions to enable users to analyze data across multiple sources or acquire data for their off-line applications.
7.1.2	The archived data function shall include an operational data control function to ensure integrity of operational data as it is received from field equipment or data collection devices.
7.1.2.1	The operational data control function shall be capable of receiving and storing all ITS operational data, as received from the source.
7.1.2.1.1	The operational data control function shall ensure ITS operational data are in proper format.
7.1.2.1.2	The operational data control function shall maintain the meta data schema for all ITS data entering the system.
7.1.2.1.3	The operational data control function shall be capable of assigning the following meta attributes, when available, to ITS operational data during the archive process.
7.1.2.1.3(a)	The equipment used to collect the data shall be archived.
7.1.2.1.3(b)	The conditions under which the data were collected shall be archived.
7.1.2.1.4	The operational control data function shall be capable of applying user-defined quality control verification on ITS data and annotating results in the appropriate meta files.
7.1.2.1.5	The operational control data function shall be capable of assigning meta-attributes to the data indicating the methods used to perform the following:
7.1.2.1.5(a)	Summarization and aggregation; and
7.1.2.1.5(b)	Transformations (i.e., reconstructing original data or constructing new data elements).
7.1.2.2	The operational control data function shall be capable of collecting user-selected data.

Table 5.1 (Continued)

User Service Requirements	Description
7.1.2.3	The operational control data function shall be capable of archiving, in data repositories, ITS operational data as received from field equipment or data collection devices.
7.1.2.4	The operational control data function shall be capable of maintaining the integrity of all received operational data.
7.1.2.5	The operational control data function shall be capable of disseminating data replicates to ITS operational users in real-time.
7.1.2.6	The operational control data function shall be capable of performing data fusion on replicated data for operational users in near real-time.
7.1.3	The archived data function shall include a data import and verification function to acquire historical data from the operational data control function.
7.1.3.1	The data import and verification function shall be capable of importing selected ITS operational data from the ITS operational repositories.
7.1.3.1.1	The data import and verification function shall be capable of importing ITS freeway operations data to include:
7.1.3.1.1(a)	Freeway traffic flow surveillance data;
7.1.3.1.1(b)	Ramp meter preemptions;
7.1.3.1.1(c)	Ramp meter operational data;
7.1.3.1.1(d)	Freeway visual and video surveillance data; and
7.1.3.1.1(e)	TMC-generated freeway flow metrics.
7.1.3.1.10	The data import and verification function shall be capable of importing ITS parking management data.
7.1.3.1.11	The data import and verification function shall be capable of importing intermodal operational data.
7.1.3.1.5	The data import and verification function shall be capable of importing ITS incident management data to include:
7.1.3.1.5(a)	Incident characteristics;
7.1.3.1.5(b)	Train arrivals at highway rail intersections;
7.1.3.1.5(c)	Emergency vehicle dispatch data;
7.1.3.1.5(d)	Emergency vehicle location data;
7.1.3.1.5(e)	Construction and work zone identification;
7.1.3.1.5(f)	Emergency request data;
7.1.3.1.5(g)	Video surveillance data; and
7.1.3.1.5(h)	Emergency response.
7.1.3.1.6	The data import and verification function shall be capable of importing ITS CVO data to include:
7.1.3.1.6(a)	Cargo identification data;
7.1.3.1.6(b)	Fleet activity data;
7.1.3.1.6(c)	HAZMAT packaging data;
7.1.3.1.6(d)	Border crossing data;
7.1.3.1.6(e)	Commercial vehicle on-board safety data; and
7.1.3.1.6(f)	Truck origin/destination and classification data.
7.1.3.1.7	The data import and verification function shall be capable of importing ITS environmental data to include:
7.1.3.1.7(a)	Emissions data; and
7.1.3.1.7(b)	Weather data.
7.1.3.1.8	The data import and verification function shall be capable of importing ITS vehicle and traveler data to include:

Table 5.1 (Continued)

User Service Requirements	Description
7.1.3.1.8(a)	Commercial and non-commercial vehicle probe data;
7.1.3.1.8(b)	Variable message sign (VMS) message set data;
7.1.3.1.8(c)	Vehicle trajectories;
7.1.3.1.8(d)	Route guidance data;
7.1.3.1.8(e)	Parking and roadway pricing change data;
7.1.3.1.8(f)	Origin/destination trip data;
7.1.3.1.8(g)	Service requests; and
7.1.3.1.8(h)	Information utilization.
7.1.3.1.9	The data import and verification function shall be capable of importing data on ITS physical characteristics of the transportation infrastructure to include:
7.1.3.1.9(a)	Roadway network attributes;
7.1.3.1.9(b)	Transit network attributes;
7.1.3.1.9(c)	Equipment maintenance status;
7.1.3.1.9(d)	Transportation facilities;
7.1.3.1.9(e)	GIS map of network; and
7.1.3.1.9(f)	Infrastructure maintenance data.
7.1.3.2	The data import and verification function shall be capable of accepting pre-defined data inputs from transportation or other sources.
7.1.3.3	The data import and verification function shall be capable of applying pre-defined quality control verification on the imported ITS data and annotating results in the appropriate meta files.
7.1.3.4	The data import and verification function shall be capable of formatting the data to conform to the archive schema.
7.1.3.5	The data import and verification function shall be capable of cleansing imported data.
7.1.3.6	The data import and verification function shall be capable of performing pre-defined data mining functions to import data.
7.1.3.7	The data import and verification function shall be capable of performing pre-defined data fusion on imported data near real-time.
7.1.3.8	The data import and verification function shall be capable of assigning meta attributes to ITS operational data if data modification is required during the historical archive process.
7.1.3.9	The data import and verification function shall be capable of notifying source system owners of potential data or equipment errors.
7.1.4	The archived data function shall provide the automatic data historical archive function for permanently archiving the data.
7.1.4.1	The automatic data historical archive function shall provide an archive schema for all ITS data entering the archives.
7.1.4.1.1	The archive schema shall preclude the possibility of identifying or tracking either individual citizens or private firms.
7.1.4.2	The automatic data historical archive shall manage the ITS historical data archiving processes for all functional areas as follows:
7.1.4.2(a)	Format data to archive schema conformance;
7.1.4.2(b)	Maintain a centralized meta schema to specify how data is archived;
7.1.4.2(c)	Maintain data quality meta attributes; and
7.1.4.2(d)	Schedule archiving of data.
7.1.4.3	The automatic data historical archive shall permanently store historical archives and only provide data replicates to users.

Table 5.1 (Continued)

User Service Requirements	Description
7.1.4.4	The automatic data historical archive shall be capable of supporting user-specified data archiving procedures as follows:
7.1.4.4(a)	When specified by a user, it shall archive operational data as received in the user's storage files.
7.1.4.4(b)	When specified by a user, it shall archive edited data in the user's storage files; and
7.1.4.4(c)	When specified by a user, it shall perform pre-defined data fusion before archiving in the user's storage files.
7.1.4.5	The automatic data historical archive shall be capable of assigning meta attributes to ITS operational data if data modification is required during the historical archive process.
7.1.5	The archived data function shall provide a data warehouse distribution function as the ITS data source to support the ITS community user functions.
7.1.5.2	The data warehouse distribution function shall include a user data products function.
7.1.5.2.1	The user data products function shall provide an online analytical functionality to generate pre-defined data products for ITS users, to include:
7.1.5.2.1(a)	Reports;
7.1.5.2.1(b)	Analyses;
7.1.5.2.1(c)	Aggregations or summaries.; and
7.1.5.2.1(d)	User-defined archiving of data concepts.
7.1.5.2.2	The user data products function shall be capable of recreating ITS operational data formats from the historical archives.
7.1.5.2.3	The user data products function shall be capable of providing user-defined data mining functions on ITS data sources.
7.1.5.2.4	The user data products function shall be capable of performing user-defined data fusion functions on data extracted from the ITS archives.
7.1.5.2.5	The user data products function shall be capable of supporting a federal data system with user-defined data products, when the necessary data is available, to include the following systems:
7.1.5.2.5(a)	HPMS;
7.1.5.2.5(b)	Truck weight study/VTRIS;
7.1.5.2.5(c)	National Bridge Inventory;
7.1.5.2.5(d)	Fatal accident reporting system;
7.1.5.2.5(e)	Highway safety information system;
7.1.5.2.5(f)	Section 15 Transit Data;
7.1.5.2.5(g)	Motor Carrier's management information system;
7.1.5.2.5(h)	HAZMAT incident reporting system;
7.1.5.2.5(i)	Grade crossing inventory system; and
7.1.5.2.5(j)	Railroad accident/incident reporting system (grade crossing portion).
7.1.5.3	The data warehouse distribution function shall have the single point of administration for the archived data system.
7.1.6	The archived data function shall provide users with an ITS community interface including all ITS users for the specification and retrieval of data products.
7.1.6.1	The ITS community interface shall be the common data interface for all ITS users to access the ITS data archives.
7.1.6.1.1	The ITS community interface shall provide users' systems with the data interface functionality.
7.1.6.2	The ITS community interface shall manage user access and security across the interface.

Table 5.1 (Continued)

| User Service Requirements	Description
7.1.6.2.1	The ITS community interface shall be capable of cleansing data to remove source privacy attributes before archiving data.
7.1.6.2.2	The ITS community interface shall be capable of cleansing data to remove source privacy attributes before exporting data to users.
7.1.6.3	The ITS community interface shall provide a user-interface functionality to existing data warehouse data schema for users to define their data products.
7.1.6.3.1	The user interface shall permit users to define access to multiple databases as data sources for their data products.
7.1.6.3.2	The user interface shall permit users to select online analytical functions to produce their data products.
7.1.6.3.3	The user interface shall permit the user to view sample data products.
7.1.6.4	The ITS community interface shall provide the user interface for ITS transportation agencies.
7.1.6.4.1	Transportation agencies shall include the following planning functions:
7.1.6.4.1(a)	Metropolitan planning organizations (MPO) and state transportation planning;
7.1.6.4.1(b)	Transportation system monitoring;
7.1.6.4.1(c)	Air quality analysis;
7.1.6.4.1(d)	MPO/State freight and intermodal planning;
7.1.6.4.1(e)	Land-use regulation and growth management;
7.1.6.4.1(f)	Transportation administration and policy analysis; and
7.1.6.4.1(g)	Transit planning.
7.1.6.4.2	Transportation agencies shall include the following ITS operational functions:
7.1.6.4.2(a)	Traffic management;
7.1.6.4.2(b)	Transit management;
7.1.6.4.2(c)	Construction and maintenance; and
7.1.6.4.2(d)	The private sector.
7.1.6.4.3	Transportation functions shall include the following safety agencies:
7.1.6.4.3(a)	Safety Planning and Administration;
7.1.6.4.3(b)	CVO; and
7.1.6.4.3(c)	Emergency Management.
7.1.6.4.4	Transportation agencies shall include research agencies.
8.0	MAINTENANCE AND CONSTRUCTION MANAGEMENT
8.1	MAINTENANCE AND CONSTRUCTION OPERATIONS
8.1.1.3.1	The maintenance vehicle fleet management function shall be capable of communicating information to vehicle operators, including but not limited to:
8.1.1.3.1(a)	Routing information;
8.1.1.3.1(b)	Scheduling data;
8.1.1.3.1(c)	Dispatch instructions;
8.1.1.3.1(d)	Corrective actions; and
8.1.1.3.1(e)	Environmental information (road and weather conditions).
8.1.1.6.1	The maintenance vehicle fleet management function shall provide information to dispatchers and vehicle operators, including but not limited to:
8.1.1.6.1(a)	Congestion;
8.1.1.6.1(b)	Incidents;
8.1.1.6.1(c)	Roadway restrictions; and

Table 5.1 (Continued)

User Service Requirements	Description
8.1.1.6.1(d)	Environmental conditions.
8.1.3.3	The work zone management and safety function shall provide systems that communicate reliable, accurate, and timely traveler information, including but not limited to:
8.1.3.3(a)	Location, including lane closure information;
8.1.3.3(b)	Alternate route and detour information;
8.1.3.3(c)	Work zone speed limit information; and
8.1.3.3(d)	Delay information.

5.2 Surface Transportation Security and Reliability Information System Model Deployment Optional Service

FDOT is submitting an application to be the model deployment of a system focused on enhancing the security and reliability of the surface transportation system through the widespread availability of real-time information. Should FDOT be granted this award, the Statewide Transportation Management Center Software Library System will require the addition of software that supports predictive analysis of surface transportation reaction to incidents based on the fusion of real-time sensor data and historical trends. The primary source of the modification to the Statewide Transportation Management Center Software Library System is to support real-time traveler information processing and dissemination. Figure 5.1 is a block diagram of the concept followed by a brief description.

Figure 5.1 –Model Deployment Integration Concept
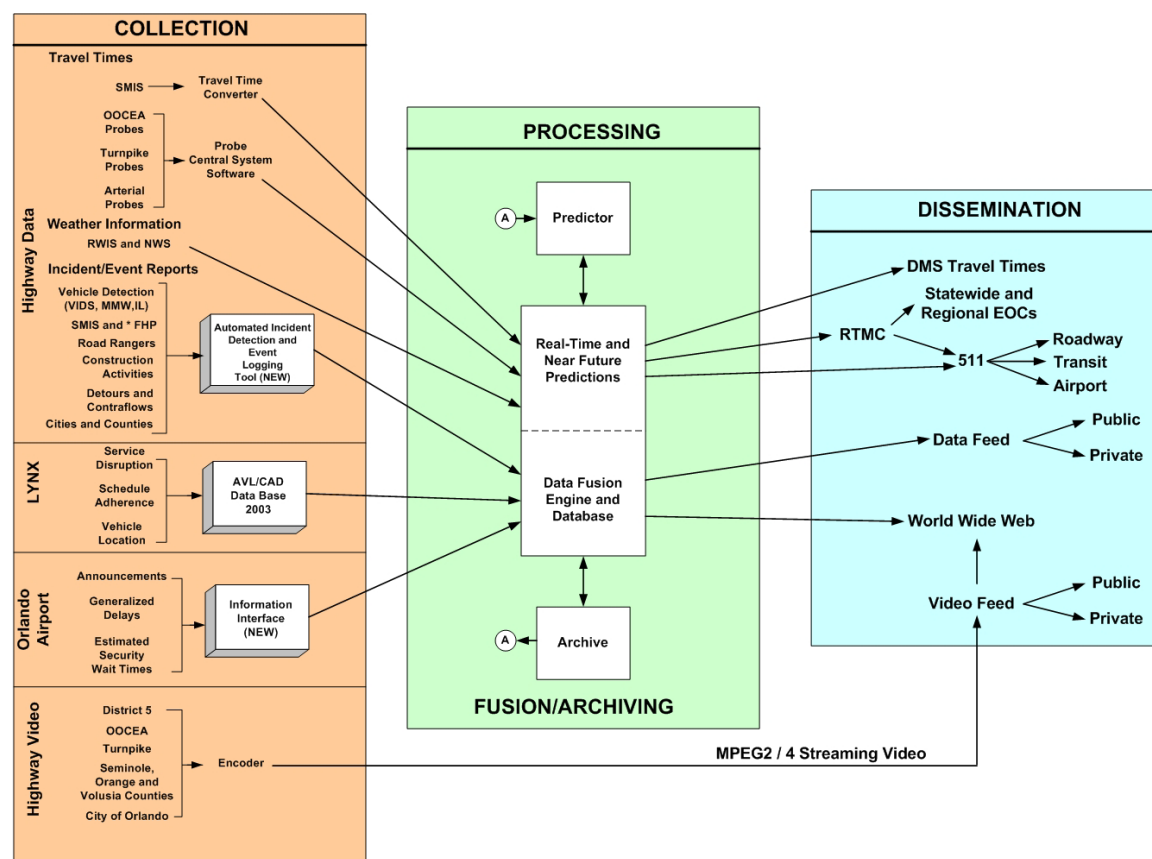
The conceptual design is based on intelligent data processing at the point of data collection. This greatly reduces the amount of raw data that needs to be handled by the processing subsystem and alleviates data bottlenecks on the communications backbone. Automated incident detection is an example of smart processing that takes place in the field. One or more vehicle detection devices provide raw data to a local processor that

detects traffic flow across specific segments of the highway. In normal operation, the automatic incident detection component will simply forward averaged highway traffic speeds over the segment of highway being monitored. If the vehicle-sensing device is set up to monitor multiple lanes, it can report average vehicle speed per lane making it easier to spot a breakdown in a specific lane and adjust DMSs accordingly and automatically. If a vehicle occupancy threshold is reached that historically has indicated an incident on the highway, the software will send an alert to the processing subsystem. The processing subsystem collects data from many field devices and will use them to verify an incident alert. For example, if a multiple lane blockage were indicated on a highway that has surveillance television (i.e., CCTV) coverage, the software would sweep the nearest camera over the site looking for image characteristics indicative of an accident. An example would be if the infrared spectrum of the scene indicated a large hot spot on a vehicle image in the scene indicating either a vehicle on fire or an over-turned vehicle (the underside of a car registers much hotter than the top side). If the processing subsystem finds correlating data from other sensors, this *fusion* of information is used to make decisions on how to respond, whom to alert, and in what order. If the processing subsystem is located at an attended facility, the software will alert the operator, display the CCTV video (if available) or other processed data, and provide a list of recommended actions. During hours of unattended operation, the software will follow a human approved script in response to a situation to control message signs and create traveler information messages. Other examples include flood sensors adjacent to roadways that can be used to close the road through automated gates and trigger trail blazer signs, lane closure signs, or lane diversion signs.

The type of data will dictate the dissemination of the data and various levels of detail will be provided depending on who will use the data. For example, the processing subsystem will forward the detailed incident data and recommended action to a workstation for an operator for response but may only send a summary of the incident data for use in a 511 traveler information message or HAR notification message.

All processed data will be archived both at the district level and centrally at FDOT headquarters in Tallahassee. Raw data will be saved for a short time at the district level, depending on the type of data and its relevance to decisions made by the processing subsystem.

The specific statement of work, functional requirements, and efforts and fees associated with this optional service will need to be identified and negotiated should the Federal Highway Administration (FHWA) award the model deployment to FDOT. Additionally, the development of specific device drivers that may be needed to support the model deployment may be included in these optional services.

EXHIBIT "C"

PROPOSAL REQUIREMENTS

STATEWIDE
TRANSPORTATION MANAGEMENT CENTER
SOFTWARE LIBRARY SYSTEM

Proposal Requirements

1.   PURPOSE AND OBJECTIVES

The Florida Department of Transportation, (hereinafter referred to as the "Department"), is seeking proposals for the provision of a Statewide Transportation Management Center Software Library System (STMCSLS). It is the desire of the Department to acquire the most technically comprehensive, advanced transportation management system available. The STMCSLS must be flexible and expandable to match the individual needs of each regional transportation management center. Each regional transportation management center shall collect, assess, and manage real-time traffic data and video and disseminate meaningful and accurate transportation management information to both the motoring public and commercial vehicle operators. The primary goal of the STMCSLS is to reduce congestion and delays while responding to traffic incidents in a rapid, accurate, and effective manner.

The Department has endorsed the concept of providing a centrally-managed, publicly-owned set of software modules to completely support all functionality of the regional transportation management centers. Exhibit "B", Requirements Specification, specifies the system functional requirements for software and hardware modules to be procured or designed and programmed. It is the Department's desire to procure software that meets the functional requirements of this specification economically, avoiding custom software development wherever possible. Proposers may offer their software product if they meet or exceed the requirements and demonstrate equivalent functionality. In some cases, it may be more cost effective for the Department to accept standard, off-the-shelf software modules that do not completely meet the system requirements and, in other cases; the Department may bear the cost of developing a customized solution for a critical functional requirement unique to Florida. The State of Florida currently has four transportation management center software systems.

2.   REFERENCE DOCUMENTS

Exhibit "A", Scope of Services, describes the services to be provided by the Contract Vendor for this contract. Section 2 of the Scope of Services provides a summary of relevant documents. Exhibit "B", Requirements Specification, documents the specifications and standards for which these services will be completed. Exhibit "C", Proposal Requirements, outlines the requirements for technical and price proposals. Exhibit "D", Evaluation Criteria, summarizes the evaluation criteria for Department to evaluate short-listed Proposers' proposals. Exhibit "E", Standard Terms and Conditions, includes the standard contracting terms and conditions applicable to this project.

3.   **EXAMINATION OF SITES**

The Proposers shall review the *Traffic Management Center Software Study* prepared by Southwest Research Institute, which is available at the following link: http://www11.myflorida.com/IntelligentTransportationSystems/Architect%20&%20Standards/ArchStandards.htm.   Existing documentation identified in Exhibit "A", Scope of Services, and Exhibit "B", Requirements Specification, provides the Proposers with sufficient information to prepare for the ITN process. Only the short-listed Proposers may visit the Department Traffic Engineering Research Laboratory (TERL) or the proposed test site at Department District 4 Broward County RTMC and District 6 Miami RTMC, if necessary.

4.   **COMMUNICATIONS**

Prospective Proposers, their agents, associates, and employees shall refrain from contacting, communicating with, or soliciting from State of Florida personnel or other agents any information regarding any matter within this ITN, except through the written question process identified in this ITN. Failure to comply with this provision may result in disqualification of any proposal in which the offending person is involved. Only those communications that are in writing from the Department will be considered duly authorized expressions on behalf of the Department except the following situations: examination of sites, review of Proposers' facilities, oral presentation, and negotiation.

5.   **FORMAT**

The technical and price proposals shall be submitted by CD-ROM using certified mail in Adobe Portable Document Format© (Version 5.0 or later) to the Official Contact Person by the date and time identified in the Critical Events and Dates table. Without exception, the character size shall not be less than twelve (12) point font, Times New Roman. Proposal pages shall include line numbering. All required forms and certifications should be submitted in a sealed envelope. The CD-ROM should be sealed in an envelope and labeled by the respondent with the negotiation number for this ITN and the name of the respondent. The short-listed Proposers shall provide twenty (20) hard copies each of the technical and price proposals for the Technical Evaluation Committee and Executive Selection Committee to review. These proposals shall address all issues covered in Exhibit "A", Scope of Services, and Exhibit "B", Requirements Specification. The short-listed Proposers shall provide an executive summary with their technical proposal not to exceed three (3) pages. The technical proposal shall not exceed seventy-five (75) pages (not including executive summary) in the format mentioned above.

The certification forms required for this ITN require a State of Florida Vendor (SPURS) Number for the entity submitting proposals. Please contact the Official Contact Person for further information.

Florida's Public Records Law, Chapter 119, *Florida Statutes*, provides that all information filed by Proposers is public information that may be inspected and copied by any person, unless the information falls within exemption to the Chapter. Pursuant to Subsection 119.07(3)(m), *Florida Statutes*, the proposals are exempt from the Public Records Law until the Department provides notice of its decision or for ten (10) days, whichever is less. After that, all proposals are open to the public. If Proposers desire to furnish any information it asserts is confidential in a response to this ITN, such information must be provided on a separate and sealed CD-ROM clearly identified as confidential. On the cover of the sealed CD-ROM and on the material, the Proposers must denote the specific *Florida Statute* that authorizes the exemption from the Public Records Law. The Department will review the information in accordance with Subsection 119.07(2), *Florida Statutes*, and if it is determined that the information is not exempt from the Public Records Law, the Proposers will be notified within a reasonable time that the information will be made available to the public for review and copying wherein the Proposers may withdraw the information, if appropriate. However, if this information is determined to be vital to the proposals, the Proposers may be deemed non-compliant.

6. ORAL PRESENTATION

All short-listed Proposers will be required to make an oral presentation. The Department will advise short-listed Proposers of the time and location that each Proposer will be required to appear for oral presentations. Attendance will be limited to a maximum of three (3) of each Proposer's team members. At a minimum, it is required that the Project Manager and the Technical Lead be present at the presentation. The oral presentation will have a maximum of two (2) hours for presentation with question and answer session. The Proposers will be limited to a maximum sixty (60) minutes to present their proposals that shall include sufficient information to enable the Department to evaluate the Proposers' capability to provide the services as described in this ITN. Following the oral presentation, the Proposers will answer questions regarding to their presentation by the Technical Evaluation Committee for up to thirty (30) minutes. Another thirty (30) minutes is allocated to the set of standardized questions prepared by Technical Evaluation Committee. This set of standardized questions will be asked to all Proposers. Presentations may be accompanied by presentation aids (e.g. PowerPoint slides, poster board maps, graphs, etc.) that help illustrate the Proposers' presentation. Proposers shall provide twenty (20) copies of their oral presentation material in both CD-ROM and hard copy format. Only one poster board is allowed in the presentation if the Proposers deem one. Presentation content shall be limited to the material presented in the proposals. Discussions of past performance on other projects shall be minimized to the extent they are discussed in the proposals and as they relate to the proposed services. The Proposers are expected to provide all the necessary equipment needed to support the Proposers' presentations. However, the Department will provide a projector, projection screen, power source, and easel.

7. CERTIFICATION

The short-listed Proposers shall certify that they have carefully examined their proposals after the same was completed and have verified each item placed thereon. The short-listed Proposers agree to indemnify, defend, save, and hold harmless the Department against any cost, damage, or expense that they may incur or that they have caused by any error in the Proposers' preparation of their proposals.

By signing and submitting the proposals, the short-listed Proposers declare and certify that:

7.1.   The persons signing the proposals have the authority to bind the Proposers.

7.2.   No principal (which includes officers, directors, or executives) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction.

7.3.   The proposals have been arrived at independently, without consultation, communication, or agreement for the purpose of restricting competition with any other Proposers or potential Proposers.

7.4.   No attempt has been made or will be made to solicit, cause, or induce any firm or person to refrain from proposing in response to this ITN or to submit a complementary document.

7.5.   The Proposers have made a diligent inquiry of all members, officers, employees, and agents of the Proposers with responsibilities relating to the preparation, approval, or submission of their proposals on this project and have been advised by each of them that they have not participated in any communication, consultation, discussion, agreement, collusion, act, or other conduct inconsistent with any of the statements and representations made in their proposals.

7.6.   The Proposers have fully informed the Department in writing of all convictions of the firm, its affiliates, and all directors, officers, and employees of the firm and its affiliates for violation of state or federal antitrust laws with respect to a public contract or for violation of any state or federal laws involving fraud, bribery, collusion, conspiracy, or material misrepresentation with respect to a public contract. This includes disclosure of the names of current employees of the firms or affiliates who were convicted of contract crimes while in the employ of another company.

7.7.   Except as noted in 9.2 below, neither the Proposers nor any person associated therewith in the capacity of owner, partner, director, officer, principal, investigator, project director, manager, auditor, and/or positions involving the administration of federal funds:

- are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions;

- have within a three (3)-year period preceding this certification been convicted of or had a civil judgment rendered against them or is

presently indicted for or otherwise criminally or civilly charged for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a federal, state, or local government transaction or public contract; violation of federal or state antitrust statutes, or commission of embezzlement, theft, forgery, bribery, falsification, or destruction of records, making false statements, or receiving stolen property; or

- have within a three (3)-year period preceding this certification had one (1) or more federal, state, or local government public transactions terminated for cause or default.

7.8.   The Proposers have not and will not knowingly enter into any transaction with any subcontractor, material supplier, or vendor who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this project by any federal agency unless authorized by the Department.

Where the Proposers are unable to declare or certify as to any of the statements contained in the above-stated paragraph, the Proposers shall provide an explanation.

8.   **RESERVATION OF RIGHTS**

The Department reserves all rights available to it by law in administering this ITN, including without limitation the right to reject any and all proposals at any time, to request or retain additional information for any proposals, to require reasonable changes and to negotiate changes in the selected proposals to more fully achieve the purposes and objectives of this ITN, and to elect not to enter into a Contract unless the Department is fully satisfied that all requirements have been fully met.

The Department reserves the right to waive any irregularities in any proposals that do not substantially affect the substance of the proposals and to request clarification of information submitted from any Proposers. Each waiver of an irregularity and each request for clarification, and response thereto, shall be documented in the Department's proposed agency action on the negotiation.

9.   TECHNICAL AND PRICE PROPOSALS REQUIREMENTS

9.1.   Scope of Proposals to Invitation to Negotiate

Proposals submitted by short-listed Proposers shall respond to the provisions of this ITN document in sufficient detail to demonstrate an internally consistent conceptual plan. The technical proposal shall address all the issues based on Exhibit "A", Scope of Services, and Exhibit "B", Requirements Specification. The price proposal shall address the detailed and total cost associated with the technical proposal. These proposals, shall demonstrate Proposers' depth of knowledge and understanding of the technical, financial, institutional, governmental, transportation, and communications execution of these services and the Proposers' ability to execute the proposal.

9.2.   Proposer Business Entity Information and Qualifications

All short-listed Proposers must submit technical and price proposals. Proposers may be private sector companies, consortia of companies, joint ventures, or combinations of private and public entities. The Proposers must be recognized legal entities that, prior to posting of intended award, are licensed to conduct business in the State of Florida with the Florida Department of State and are authorized with the Florida Department of State. The short-listed Proposers shall provide the following information along with technical and price proposals:

9.2.1.   *Name and Address* – The Proposer's legal name and address of the principal place of business and the street address and phone number of a Florida business location, if any;

9.2.2.   *Ownership, Business Form, and Structure of Proposer* – Provide information specifying the ownership, form of business entity, and principal point of contact of the organization in whose name the proposals are submitted; and

9.2.3.   *Business Entity Financial Information* – The Proposer shall provide such financial information as reasonably necessary to demonstrate the entity's financial ability to accomplish the proposals;

9.2.4.   *Official Proposer Contact* – Provide the name, address, voice phone number, fax phone number, and electronic mail address of the official representative or executive officer of the Proposer. This person shall have the authority to bind the Proposer and will be used by the Department in all official communications relating to the proposals until the Department is notified in writing of a change in the contact.

EXHIBIT "D"

EVALUATION AND SELECTION CRITERIA

STATEWIDE

TRANSPORTATION MANAGEMENT CENTER

SOFTWARE LIBRARY SYSTEM

EVALUATION AND SELECTION CRITERIA

1.　**INTRODUCTION**

The Department has defined a multi-step evaluation and selection process as specified in the Section 7, Critical Events and Dates, under the Special Conditions. The Department will consider and evaluate all information required to be submitted by this ITN, including information presented during oral presentation, and to the extent each requirement for solicited information is an evaluation criteria.

2.　**EVALUATION OF PROPOSERS' QUALIFICATIONS**

The first phase of the process will result in the selection of short-listed Proposers who are requested to submit formal technical and price proposals. The Proposers shall submit all the forms identified in the ITN Registration Form in accordance with the Critical Event 7.5. This evaluation will use the Qualifications Questionnaire Table to score the Proposers. All of the answers to the Qualifications Questionnaire Form responses will be evaluated by weighted evaluation criteria. The Department will analyze the information submitted in relation to the information required and evaluation criteria of this ITN. Those Proposers whose score exceeds threshold value will be short listed to the subsequent negotiation.

The criteria listed below will be used to evaluate the responses provided to the Qualifications Questionnaire Form.

1. Experiences of the Proposer with regard to prior experience in developing TMC projects of similar type, size, scope, and complexity to the STMCSLS.
2. References of successfully completed TMC software projects.
3. Experiences of the Proposer's technical personnel with the software products and tools specified for use during the development of the STMCSLS.
4. Experiences of the Proposer's management personnel who have managed projects of similar size and complexity.
5. The assessment of the various plans, processes and programs.
6. The assessment of the Proposer's development methodology.
7. The assessment of the use of disadvantaged business enterprises (DBE).

The most-qualified Proposer(s) as indicated in Critical Event 7.7 will be short listed and requested to submit technical and price proposals as indicated in Critical Event 7.9.

3. EVALUATION OF SHORT-LISTED PROPOSERS' TECHNICAL AND PRICE PROPOSALS AND SELECTION CRITERIA

Negotiations will be conducted with short-listed Proposers until the negotiations are finalized. The technical and price proposals will be qualitatively evaluated by the Technical Evaluation Committee as indicated in Critical Event 7.10. A detailed evaluation form will be used by Department personnel during the proposals evaluation. Proposals will be assessed by the following criteria:

1. The Proposer's understanding of Exhibit "A", Scope of Services, and Exhibit "B", Requirements Specification.
2. The Proposer's approaches to acquire, provide, or develop public domain software that may become a part of required for the STMCSLS.
3. The Proposer's TMC software development personnel and methodology.
4. The Proposer's understanding of field testing requirements.
5. The Proposer's facilities.
6. The assessment of the Proposer's ability to provide innovative and cost-effective services.
7. The Proposer's enhancements of existing TMC softwares.
8. The Proposer's project schedule and associated resources. The schedule shall include a staged software release, which meets the deployment, priority, and requirements of the Department.
9. Other requirements deemed necessary by the Technical Evaluation Committee during the evaluation phase.

All of the short-listed Proposers are scheduled to provide oral presentations in accordance with Critical Event 7.12 and in Section 6, Oral Presentation, under Exhibit "C", Proposal Requirements. The presentations shall indicate the Proposer's capabilities and will participate in a question and answer session on the requested services. The meeting may be used to clarify proposals concepts, to exchange innovative ideas and to improve the Proposer's understanding of the Department's needs.

The Department intends to enter into negotiations with short-listed Proposers as indicated in Critical Event 7.13. At the end of negotiations, Proposers shall provide best and final offers of services with prices, terms, and conditions for the STMCSLS. The Department will maintain a record of the negotiations held with each Proposer. When it is deemed to be in the best interest of the Department, the Department may authorize or require the use of alternative negotiation procedures. The Department will select the Contract Vendor who provides the best value for the State.

EXHIBIT "E"

STANDARD TERMS AND CONDITIONS

STATEWIDE

TRANSPORTATION MANAGEMENT CENTER

SOFTWARE LIBRARY SYSTEM

Procurement No.   ITN-DOT-02/03-9025-RR

1.   SERVICES AND PERFORMANCE

A.   The Department does hereby retain the Contract Vendor to furnish, within the manner and at the location specified, certain services, information, and items as specified in the competitive procurement documents, the Purchase Order, and attached Exhibits which are integral parts of this Contract.

B.   All services shall be performed by the Contract Vendor to the satisfaction of the Director who shall decide all questions, difficulties and disputes of any nature whatsoever that may arise under or by reason of this Contract. The Director's decision upon all claims, questions and disputes shall be final and binding upon all parties.   Adjustments of compensation and contract time because of any major changes in the work that may become necessary or desirable shall be left to the absolute discretion of the Director.

Reference herein to the Director shall mean the Department's State Highway Engineer.

C.   Before any additions or deletions to the work described in this Contract, and before undertaking any changes or revisions to such work, the Department shall issue a Change Order covering such modifications and the compensation to be paid therefore.

2.   TERM

A.   Subsequent to issuing of the Purchase Order, the services to be rendered by the Contract Vendor shall commence and be completed by the date specified on the Purchase Order.

B.   EXTENSIONS. In the event that circumstances arise which make performance by the Contract Vendor impracticable or impossible within the time allowed or which prevent a new contract from being executed, the Department, in its discretion, may grant an extension of this Contract. Extension of this Contract shall be in writing for a period not to exceed six (6) months and shall be subject to the same terms and conditions set forth in this Contract; provided the Department may, in its discretion, grant a proportional increase in the total dollar amount based on the method and rate established herein. There shall be only one extension of this Contract unless the failure to meet the criteria set forth in this Contract for completion of this Contract is due to events beyond the control of the Contract Vendor.

It shall be the responsibility of the Contract Vendor to ensure at all times that sufficient time remains in the Project Schedule within which to complete services on the project. In the event there have been delays which would affect the project completion date, the Contract Vendor shall submit a written request to the Department which identifies the reason(s) for the delay and the amount of time related to each reason. The Department will review the request and make a determination as to granting all or part of the requested extension.

3.   COMPENSATION AND PAYMENT

A.   Payment shall be made only after receipt and approval of goods and services unless advance payments are authorized by the State Comptroller under section 215.422(14), Florida Statutes.

B. If this Contract involves units of deliverables, then such units must be received and accepted in writing by the Contract Manager prior to payments.

C. Bills for fees or other compensation for services or expenses shall be submitted in detail sufficient for a proper preaudit and postaudit thereof.

D. Bills for travel expenses specifically authorized in this agreement shall be submitted and paid in accordance with Section 112.061, Florida Statutes.

E. Contract Vendors providing goods and services to the Department should be aware of the following time frames. Upon receipt, the Department has five (5) working days to inspect and approve the goods and services, unless the Contract specifies otherwise. The Department has 20 days to deliver a request for payment (voucher) to the Department of Banking and Finance. The 20 days are measured from the latter of the date the invoice is received or the goods or services are received, inspected and approved.

F. If a payment is not available within 40 days, a separate interest penalty as established pursuant to Section 215.422(3)(b), Florida Statutes, will be due and payable, in addition to the invoice amount, to the Contract Vendor. Interest penalties of less than one (1) dollar will not be enforced unless the Contract Vendor requests payment. Invoices which have to be returned to Contract Vendor because of Contract Vendor preparation errors will result in a delay in the payment.   The invoice payment requirements do not start until a properly completed invoice is provided to the Department.

G. A vendor ombudsman has been established within the Department of Banking and Finance. The duties of this individual include acting as an advocate for contractors/vendors who may be experiencing problems in obtaining timely payment(s) from a state agency. The Vendor Ombudsman may be contacted at (904) 488-2924 or by calling the State Comptroller's Hotline, 1-800-848-3792.

H. Records of costs incurred under terms of this Contract shall be maintained and made available upon request to the Department at all times during the period of this Contract and for three years after final payment is made. Copies of these documents and records shall be furnished to the Department upon request. Records of costs incurred includes the Contract Vendor's general accounting records and the project records, together with supporting documents and records, of the Contract Vendor and all subcontractors performing work on the project, and all other records of the Contract Vendor and subcontractors considered necessary by the Department for a proper audit of costs.

I. The Department, during any fiscal year, shall not expend money, incur any liability, or enter into any contract which, by its terms, involves the expenditure of money in excess of the amounts budgeted as available for expenditure during such fiscal year. Any contract, verbal or written, made in violation of this subsection is null and void, and no money may be paid on such contract. The Department shall require a statement from the Comptroller of the Department that funds are available prior to entering into any such contract or other binding commitment of funds. Nothing herein contained shall prevent the making of contracts for periods exceeding one year, but any contract so made shall be executory only for the value of the services to be rendered or agreed to be paid for in succeeding fiscal years. Accordingly, the State of Florida's performance and obligation to pay under this Contract is contingent upon an annual appropriation by the Legislature.

4.   INDEMNITY AND PAYMENT FOR CLAIMS

   A.   INDEMNITY: The Contract Vendor shall indemnify and hold harmless the Department, its officers and employees from liabilities, damages, losses and costs, including, but not limited to, reasonable attorneys fees, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of the Contract Vendor and persons employed or utilized by the Contract Vendor in the performance of this Contract.

   It is specifically agreed between the parties executing this Contract that it is not intended by any of the provisions of any part of the Contract to create in the public or any member thereof, a third party beneficiary hereunder, or to authorize anyone not a party to this Contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of this Contract.

   PAYMENT FOR CLAIMS: The Contract Vendor guaranties the payment of all just claims for materials, supplies, tools, or labor and other just claims against the Contract Vendor or any subcontractor, in connection with the Contract.   The Department's final acceptance and payment does not release the Contract Vendor's bond until all such claims are paid or released.

5.   COMPLIANCE WITH LAWS

   A.   The Contract Vendor shall allow public access to all documents, papers, letters, or other material subject to the provisions of Chapter 119, Florida Statutes, and made or received by the Contract Vendor in conjunction with this Contract. Failure by the Contract Vendor to grant such public access shall be grounds for immediate unilateral cancellation of this Contract by the Department. However, upon receipt of any such public records request, the Contract Vendor shall immediately notify the Department's Contract Manager and secure his prior written consent before releasing such records.

   B.   The Contract Vendor agrees that it shall make no statements, press releases or publicity releases concerning this Contract or its subject matter or otherwise disclose or permit to be disclosed any of the data or other information obtained or furnished in compliance with this Contract, or any particulars thereof, during the period of the Contract, without first notifying the Department's Contract Manager and securing prior written consent.

   C.   The Contract Vendor shall comply with all federal, state and local laws and ordinances applicable to the work or payment for work thereof, and shall not discriminate on the grounds of race, color, religion, sex, national origin, age, or disability in the performance of work under this Contract.

   D.   The Contract Vendor shall carry and keep in force Worker's Compensation insurance as required for the State of Florida under the Worker's Compensation Law.

   E.   If the Contract Vendor is licensed by the Department of Business and Professional Regulation to perform the services herein contracted, then Section 337.162, Florida Statutes, applies as follows:

   (1)   If the Department has knowledge or reason to believe that any person has violated the provisions of state professional licensing laws or rules, it shall submit a complaint regarding the violations to the Department of Business and Professional Regulation.

   (2)   Any person who is employed by the Department and who is licensed by the Department of Business and Professional Regulation and who, through the course of the person's employment, has knowledge to believe that any person has violated the provisions of state professional licensing laws or rules shall submit a complaint regarding the violations to the Department of Business and Professional

Regulation. Failure to submit a complaint about the violations may be grounds for disciplinary action pursuant to Chapter 455, Florida Statutes, and the state licensing law applicable to that licensee.

(3)   Any complaints submitted to the Department of Business and Professional Regulation are confidential and exempt from Section 119.07(1), Florida Statutes, pursuant to chapter 455, Florida Statutes, and applicable state law.

F.   Contract Vendor covenants and agrees that it and its employees shall be bound by the standards of conduct provided in applicable Florida Statutes and applicable rules of the Board of Business and Professional Regulation as they relate to work performed under this Contract. Contract Vendor further covenants and agrees that when a former state employee is employed by the Contract Vendor, the Contract Vendor will require that strict adherence by the former state employee to Sections 112.313 and 112.3185, Florida Statutes, is a condition of employment for said former state employee. These statutes will by reference be made a part of this Contractt as though set forth in full. Contract Vendor agrees to incorporate the provisions of this paragraph in any subcontract into which it might enter with reference to the work performed pursuant to this Contract.

6.   TERMINATION AND DEFAULT

A.   This Contract may be cancelled by the Department in whole or in part at any time the interest of the Department requires such termination. The Department also reserves the right to seek termination or cancellation of this Contract in the event the Contract Vendor shall be placed in either voluntary or involuntary bankruptcy. The Department further reserves the right to terminate or cancel this Contract in the event an assignment be made for the benefit of creditors. This Contract may be cancelled by the Contract Vendor only by mutual consent of both parties.

B.   If the Department determines that the performance of the Contract Vendor is not satisfactory, the Department shall have the option of (a) immediately terminating the Contract, or (b) notifying the Contract Vendor of the deficiency with a requirement that the deficiency be corrected within a specified time, otherwise the Contract will be terminated at the end of such time, or (c) take whatever action is deemed appropriate by the Department.

C.   If the Department requires termination of the Contract for reasons other than unsatisfactory performance of the Contract Vendor, the Department shall notify the Contract Vendor of such termination, with instructions as to the effective date of termination or specify the stage of work at which the Contract is to be terminated.

D .   If the Contract is terminated before performance is completed, the Contract Vendor shall be paid only for that work satisfactorily performed for which costs can be substantiated. Such payment, however, may not exceed an amount which is the same percentage of the contract price as the amount of work satisfactorily completed is a percentage of the total work called for by this Contract. All work in progress will become the property of the Department and will be turned over promptly by the Contract Vendor.

7. ASSIGNMENT AND SUBCONTRACTS

A. The Contract Vendor shall not sublet, assign or transfer any work under this Contract without the prior written consent of the Department.

B. Check the appropriate box:

[X] The following provisions are not applicable to this Contract:

[   ] The following provision is hereby incorporated in and made a part of this Contract:

It is expressly understood and agreed that any articles which are the subject of, or required to carry out this Contract shall be purchased from the corporation identified under Chapter 946, Florida Statutes, in the same manner and under the procedures set forth in Section 946.515(2) and (4), Florida Statutes; and for purposes of this Contract the person, firm, or other business entity (Contract Vendor) carrying out the provisions of this Contract shall be deemed to be substituted for this agency (Department) insofar as dealings with such corporation are concerned.

The "corporation identified" is Prison Rehabilitative Industries and Diversified Enterprises, Inc. (PRIDE). Available pricing, products, and delivery schedules may be obtained by contacting:

PRIDE of Florida (Attn: Bid Administrator)
2720 Blair Stone Road, Suite G
Tallahassee, Florida 32301
Telephone: (904) 487-3774

[   ] This Contract involves the expenditure of Federal funds and hence, Section 946.515, Florida Statutes, as noted above, does not apply. However, Appendix I is applicable to all parties and is hereof made a part of this Contract.

8. MISCELLANEOUS

A. The Contract Vendor and the Department agree that the Contract Vendor, its employees, and subcontractors are not agents of the Department as a result of this Contract for purposes other than those set out in Section 337.274, Florida Statutes.

B. All words used herein in the singular form shall extend to and include the plural. All words used in the plural form shall extend to and include the singular. All words used in any gender shall extend to and include all genders.

C. This Contract embodies the whole agreement of the parties. There are no promises, terms, conditions, or obligations other than those contained herein, and this Contract shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties hereto.

D.   It is understood and agreed by the parties hereto that if any part, term or provision of this Contract is by the courts held to be illegal or in conflict with any law of the State of Florida, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Contract did not contain the particular part, term or provision held to be invalid.

E.   This Contract shall be governed by and construed in accordance with the laws of the State of Florida.

F.   In any legal action related to this Contract, instituted by either party, Contract Vendor hereby waives any and all privileges and rights it may have under Chapter 47 and Section 337.19, Florida Statutes, relating to venue, as it now exists or may hereafter be amended, and any and all such privileges and rights it may have under any other statute, rule, or case law, including, but not limited to those grounded on convenience. Any such legal action may be brought in the appropriate Court in any county chosen by the Department and in the event that any such legal action is filed by Contract Vendor, Contract Vendor hereby consents to the transfer of venue to the county chosen by the Department upon the Department filing a motion requesting the same.