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**ITS Projects – Systems Engineering Analysis FORM (SEAFORM)**

**The Checklist needs to be filled out by the Project Manager. Please refer to the guidance document accompanying the checklist for information on the checklist items as well as a completed example.**

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| --- | --- | --- |
| **Project Name:** | | |
| **Date** | **Name of Person Filling/Modifying the Form** | **Notes** |
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| **ITS Projects – Systems Engineering Analysis FORM (SEAFORM)** | | | | | |
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| **SECTION 1 – Project Information** | | | | | |
| **1.1 PROJECT TITLE** | | | | **1.2 PROJECT NUMBER**  New Project  Modification to existing Project | |
| **1.3 BRIEF DESCRIPTION/PURPOSE** | | | | | |
| **1.4 CONTACT PERSON/GROUP** | **1.5 PROJECT LOCATION** | | **1.6 PERIOD OF PERFORMANCE** | | **1.7 BUDGET & FUNDING SOURCE** |
| **1.8 NATURE OF WORK**  Scoping  Design  Software/Integration  Implementation  Operations  Evaluations  Others (Please specify)  If Other, Please Specify | | | | | |
| **1.9 RELATIONSHIP TO OTHER PROJECTS AND PHASES** | | | | | |
| **1.10 EQUIPMENT TO BE PURCHASED WITH PROJECT FUNDING** | | | | | |
| **1.11 STATUS**  CMAQ  Environmental Compliance, If applicable  SLOSS/Safety Improvement | | TIP/STIP Approval  FHWA Authorization | | | |
| **1.12 IS THERE A WORK PLAN FOR THIS PROJECT WITH TASK BREAKDOWN?**  No  Yes, Provide Document Reference  ToBe Developed | | | | | |
| **SECTION 2 – Needs Assessment** | | | | | |
| **2.1 WHAT IS/ARE THE PROBLEM(S) WITH THE CURRENT SITUATION?** | | | | | |
| **2.2 WHAT NEEDS DOES THIS PROJECT ADDRESS?** | | | | | |
| **2.3 HOW WERE THESE NEEDS IDENTIFIED?**  Internal CTDOT Assessment  Town / City Request  From CE Technical Review or other studies  Other  Please provide details on how needs were identified – If other documentation was used as reference, please identify it here. | | | | | |
| **SECTION 3 – Regional Architecture Assessment and Concept Exploration** | | | | | |
| **3.1 TOWN / CITY IN CTDOT REGIONAL ARCHITECTURE INCLUDED IN DESIGN ATMS03**    Included  Yes  No  Architecture is a project specific description of both logical and physical elements arranged in a hierarchical form showing inter-connections among the elements. | | | | | |
| **3.2 INVENTORY CURRENT SYSTEMS IN CTDOT REGIONAL ARCHITECTURE INCLUDED IN PROJECT** | | | | | |
| **3.3 SYSTEM IMPACTS / INTEGRATION (I.E DATA EXCHANGES) DUE TO PROJECT. PORTIONS OF ARCHITECTURE BEING IMPLEMENTED** | | | | | |
| **3.4 OTHER REGIONAL ARCHITECTURES IMPACTED BY PROJECT**  NYDOT  Massachusetts  Other CTDOT Districts  CTDOT Statewide  None  Changes communicated to appropriate architecture maintenance agencies  Yes No | | | | | |
| **3.5 CHANGES RECOMMENDED TO CTDOT and/or REGIONAL ARCHITECTURES**  YesNo  If “Yes”, Please Specify and provide detail | | | | | |
| **SECTION 4 – Alternative Analysis** | | | | | |
| **4.1 WERE ANY ALTERNATE CONCEPTS/IDEAS CONSIDERED? ANY OTHER SOLUTIONS TO THE PROBLEM?**  Yes  No  Please Specify how the best concept was selected | | | | | |
| **4.2 REFERENCE DOCUMENTS (IF ANY)** | | | | | |
| **SECTION 5 – Concept of Operations** | | | | | |
| **5.1 IS THERE A CONCEPT OF OPERATIONS (COO) FOR THIS PROJECT?**  Yes  No  To Be Developed  If “No” was selected, please specify reason    The Concept of Operations is a description of how the system will be used. | | | | | |
| **5.2 IF “Yes” WAS SELECTED, PLEASE FILL OUT THE FOLLOWING**  COO Contains:  Scope (Geographic, Timeframe, Region etc)  Yes  No   * Description of what the project/system is expected to do  Yes  No * Roles and Responsibilities for Town / City / State  Yes  No * Operational Scenarios  Yes  No * Project/System Impacts  Yes  No   If “No” was checked in any of the boxes, please specify reason | | | | | |
| **SECTION 6 – Requirement Definitions (High-Level and Detailed)** | | | | | |
| **6.1 ARE HIGH-LEVEL FUNCTIONAL REQUIREMENTS WRITTEN AND DOCUMENTED**  Yes  No  To Be Developed  High-level design is the transitional step between WHAT the proposed requirements i.e. Design Scope and HOW system will be implemented i.e. Preliminary Engineering, Preliminary Design, SF and FD. | | | | | |
| **6.2 IF “Yes” WAS SELECTED, PROVIDE REQUIREMENTS DOCUMENT REFERENCE IF AVAILABLE**    Attached  Unavailable | | | | | |
| **SECTION 7 – Detailed Design** | | | | | |
| **7.1 IS THERE A DESIGN DOCUMENT AVAILABLE**  Yes  No  To Be Developed  Please provide reference to design document  Signal system elements, standard interfaces and System Integration structured into modules. | | | | | |
| **7.2 IF “YES” Was SELECTED, Please fill out the following**  Are the design details well documented  Yes  No  Do the details of the design trace to requirements definitions  Yes  No  Are boundaries and interfaces of the system clearly identified  Yes  No  (Limit of computer, signal, camera control)  Is there a process for Configuration Control  Yes  No  (System Setup by Contractor or Highway ops.)  If No was checked in above boxes , please provide an explanation | | | | | |
| **7.3 DOES THE DESIGN INCORPORATE NATIONAL ITS STANDARDS**  No  Yes  IF YES, Please mention what ITS Standards are being used  Standards development statuses as of May 2, 2007 http://www.standards.its.dot.gov/Status\_Published.asp  NEMA/AASHTO/ITE  [Advanced Transportation Controller (ATC) Standard Specification for the Type 2070 Controller    ITE ATC Type 2070](http://www.standards.its.dot.gov/StdsSummary.asp?ID=398)  AASHTO/ITE  [Standard for Functional Level Traffic Management Data Dictionary (TMDD)   ITE TM 1.03](http://www.standards.its.dot.gov/StdsSummary.asp?ID=371)  [Message Sets for External TMC Communication (MS/ETMCC)   ITE TM 2.01](http://www.standards.its.dot.gov/StdsSummary.asp?ID=326)  AASHTO/ITE/NEMA  [Transportation Management Protocols (TMP)   NTCIP 1103](http://www.standards.its.dot.gov/StdsSummary.asp?ID=355)  [Center-to-Center Naming Convention Specification   NTCIP 1104](http://www.standards.its.dot.gov/StdsSummary.asp?ID=335)  [Object Definitions for Signal Control and Prioritization (SCP)   NTCIP 1211](http://www.standards.its.dot.gov/StdsSummary.asp?ID=394)  [Structure and Identification of Management Information   NTCIP 8004](http://www.standards.its.dot.gov/StdsSummary.asp?ID=395)  [Testing and Conformity Assessment Documentation within NTCIP Standards Publications   NTCIP 8007](http://www.standards.its.dot.gov/StdsSummary.asp?ID=416)  ANSI  [Commercial Vehicle Safety Reports   ANSI TS284](http://www.standards.its.dot.gov/StdsSummary.asp?ID=306)  [Commercial Vehicle Safety and Credentials Information Exchange   ANSI TS285](http://www.standards.its.dot.gov/StdsSummary.asp?ID=307)  [Commercial Vehicle Credentials   ANSI TS286](http://www.standards.its.dot.gov/StdsSummary.asp?ID=305)  APTA  [Standard for Transit Communications Interface Profiles   APTA TCIP-S-001 3.0.0](http://www.standards.its.dot.gov/StdsSummary.asp?ID=411)  ASTM  [Standard Specification for Dedicated Short Range Communication (DSRC) Physical Layer using Microwave in the 902-928 MHz Band   ASTM E2158-01](http://www.standards.its.dot.gov/StdsSummary.asp?ID=365)  [Standard Specification for Telecommunications and Information Exchange Between Roadside and Vehicle Systems - 5 GHz Band Dedicated Short Range Communications (DSRC) Medium Access Control (MAC) and Physical Layer (PHY) Specifications   ASTM E2213-03](http://www.standards.its.dot.gov/StdsSummary.asp?ID=390)  [Standard Guide for Archiving and Retrieving ITS-Generated Data   ASTM E2259-03](http://www.standards.its.dot.gov/StdsSummary.asp?ID=396)  [Standard Practice for Metadata to Support Archived Data Management Systems   ASTM E2468-05](http://www.standards.its.dot.gov/StdsSummary.asp?ID=420)  EIA  [Data Radio Channel (DARC) System   EIA 794](http://www.standards.its.dot.gov/StdsSummary.asp?ID=310)  [Subcarrier Traffic Information Channel (STIC) System   EIA 795](http://www.standards.its.dot.gov/StdsSummary.asp?ID=376)  IEEE  [Standard for Message Sets for Vehicle/Roadside Communications   IEEE 1455-1999](http://www.standards.its.dot.gov/StdsSummary.asp?ID=372)  [Standard for Common Incident Management Message Sets for use by Emergency Management Centers    IEEE 1512 -2006](http://www.standards.its.dot.gov/StdsSummary.asp?ID=368)  [Standard for Traffic Incident Management Message Sets for Use by Emergency Management Centers   IEEE 1512.1-2006](http://www.standards.its.dot.gov/StdsSummary.asp?ID=375)  [Standard for Public Safety Traffic Incident Management Message Sets for Use by Emergency Management Centers    IEEE 1512.2-2004](http://www.standards.its.dot.gov/StdsSummary.asp?ID=373)  [Standard for Hazardous Material Incident Management Message Sets for Use by Emergency Management Centers   IEEE 1512.3-2006](http://www.standards.its.dot.gov/StdsSummary.asp?ID=391)  [Standard for the Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection   IEEE 1570-2002](http://www.standards.its.dot.gov/StdsSummary.asp?ID=400)  [Standard for Wireless Access in Vehicular Environments (WAVE) - Resource Manager   IEEE 1609.1-2006](http://www.standards.its.dot.gov/StdsSummary.asp?ID=404)  [Standard for Wireless Access in Vehicular Environments (WAVE) - Security Services for Applications and Management Messages   IEEE 1609.2-2006](http://www.standards.its.dot.gov/StdsSummary.asp?ID=405)  [Standard for Wireless Access in Vehicular Environments (WAVE) - Multi-Channel Operation   IEEE 1609.4-2006](http://www.standards.its.dot.gov/StdsSummary.asp?ID=415)  [Standard for Wireless Access in Vehicular Environments (WAVE) - Networking Services   IEEE P1609.3](http://www.standards.its.dot.gov/StdsSummary.asp?ID=406)  [The Survey and Analysis of Existing Standards and those Under Development Applicable to the Needs of the Intelligent Transportation System (ITS) Short Range and Wide Area Wireless and Wireline Technologies   IEEE SH94633-SH94638](http://www.standards.its.dot.gov/StdsSummary.asp?ID=377)  NEMA/AASHTO/ITE  [Advanced Transportation Controller (ATC)    ITE ATC Controller 5.2](http://www.standards.its.dot.gov/StdsSummary.asp?ID=304)  [ITS Standard Specification for Roadside Cabinets   ITE ITS Cabinet](http://www.standards.its.dot.gov/StdsSummary.asp?ID=302)  AASHTO/ITE  [TMDD & MS/ETMCC Guide Standard for Functional Level Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications   ITE TMDD Guide](http://www.standards.its.dot.gov/StdsSummary.asp?ID=511)  AASHTO/ITE/NEMA  [Simple Transportation Management Framework (STMF)   NTCIP 1101](http://www.standards.its.dot.gov/StdsSummary.asp?ID=354)  [Octet Encoding Rules (OER) Base Protocol   NTCIP 1102](http://www.standards.its.dot.gov/StdsSummary.asp?ID=334)  [Global Object Definitions   NTCIP 1201](http://www.standards.its.dot.gov/StdsSummary.asp?ID=340)  [Object Definitions for Actuated Traffic Signal Controller (ASC) Units   NTCIP 1202](http://www.standards.its.dot.gov/StdsSummary.asp?ID=345)  [Object Definitions for Dynamic Message Signs (DMS)   NTCIP 1203](http://www.standards.its.dot.gov/StdsSummary.asp?ID=347)  [Object Definitions for Environmental Sensor Stations (ESS)   NTCIP 1204](http://www.standards.its.dot.gov/StdsSummary.asp?ID=348)  [Object Definitions for Closed Circuit Television (CCTV) Camera Control   NTCIP 1205](http://www.standards.its.dot.gov/StdsSummary.asp?ID=339)  [Object Definitions for Data Collection and Monitoring (DCM) Devices   NTCIP 1206](http://www.standards.its.dot.gov/StdsSummary.asp?ID=346)  [Object Definitions for Ramp Meter Control (RMC) Units   NTCIP 1207](http://www.standards.its.dot.gov/StdsSummary.asp?ID=353)  [Object Definitions for Closed Circuit Television (CCTV) Switching   NTCIP 1208](http://www.standards.its.dot.gov/StdsSummary.asp?ID=349)  [Data Element Definitions for Transportation Sensor Systems (TSS)   NTCIP 1209](http://www.standards.its.dot.gov/StdsSummary.asp?ID=344)  APTA  [TCIP Framework Standard   NTCIP 1400](http://www.standards.its.dot.gov/StdsSummary.asp?ID=381)  [TCIP Common Public Transportation (CPT) Objects   NTCIP 1401](http://www.standards.its.dot.gov/StdsSummary.asp?ID=378)  [TCIP Incident Management (IM) Objects   NTCIP 1402](http://www.standards.its.dot.gov/StdsSummary.asp?ID=382)  [TCIP Passenger Information (PI) Objects   NTCIP 1403](http://www.standards.its.dot.gov/StdsSummary.asp?ID=384)  [TCIP Scheduling/Runcutting (SCH) Objects   NTCIP 1404](http://www.standards.its.dot.gov/StdsSummary.asp?ID=385)  [TCIP Spatial Representation (SP) Objects   NTCIP 1405](http://www.standards.its.dot.gov/StdsSummary.asp?ID=386)  [TCIP On-Board (OB) Objects   NTCIP 1406](http://www.standards.its.dot.gov/StdsSummary.asp?ID=383)  [TCIP Control Center (CC) Objects   NTCIP 1407](http://www.standards.its.dot.gov/StdsSummary.asp?ID=379)  [TCIP Fare Collection (FC) Business Area Objects   NTCIP 1408](http://www.standards.its.dot.gov/StdsSummary.asp?ID=380)  AASHTO/ITE/NEMA  [Class B Profile   NTCIP 2001](http://www.standards.its.dot.gov/StdsSummary.asp?ID=338)  [Point to Multi-Point Protocol Using RS-232 Subnetwork Profile   NTCIP 2101](http://www.standards.its.dot.gov/StdsSummary.asp?ID=351)  [Point to Multi-Point Protocol Using FSK Modem Subnetwork Profile   NTCIP 2102](http://www.standards.its.dot.gov/StdsSummary.asp?ID=358)  [Point-to-Point Protocol Over RS-232 Subnetwork Profile   NTCIP 2103](http://www.standards.its.dot.gov/StdsSummary.asp?ID=356)  [Ethernet Subnetwork Profile   NTCIP 2104](http://www.standards.its.dot.gov/StdsSummary.asp?ID=357)  [Transportation Transport Profile   NTCIP 2201](http://www.standards.its.dot.gov/StdsSummary.asp?ID=328)  [Internet (TCP/IP and UDP/IP) Transport Profile   NTCIP 2202](http://www.standards.its.dot.gov/StdsSummary.asp?ID=343)  [Simple Transportation Management Framework (STMF) Application Profile   NTCIP 2301](http://www.standards.its.dot.gov/StdsSummary.asp?ID=332)  [Trivial File Transfer Protocol (TFTP) Application Profile   NTCIP 2302](http://www.standards.its.dot.gov/StdsSummary.asp?ID=333)  [File Transfer Protocol (FTP) Application Profile   NTCIP 2303](http://www.standards.its.dot.gov/StdsSummary.asp?ID=331)  [Application Profile for DATEX-ASN (AP-DATEX)   NTCIP 2304](http://www.standards.its.dot.gov/StdsSummary.asp?ID=330)  [Profile Framework   NTCIP 8003](http://www.standards.its.dot.gov/StdsSummary.asp?ID=352)  [NTCIP Guide   NTCIP 9001](http://www.standards.its.dot.gov/StdsSummary.asp?ID=508)  [XML in ITS Center-to-Center Communications   NTCIP 9010](http://www.standards.its.dot.gov/StdsSummary.asp?ID=417)  SAE  [Truth-in-Labeling Standard for Navigation Map Databases   SAE J1663](http://www.standards.its.dot.gov/StdsSummary.asp?ID=389)  [Serial Data Communications Between Microcomputer Systems in Heavy-Duty Vehicle Applications   SAE J1708](http://www.standards.its.dot.gov/StdsSummary.asp?ID=363)  [ISP-Vehicle Location Referencing Standard    SAE J1746](http://www.standards.its.dot.gov/StdsSummary.asp?ID=314)  [Standard Metrology for Vehicular Displays   SAE J1757](http://www.standards.its.dot.gov/StdsSummary.asp?ID=412)  [ITS Data Bus Data Security Services   SAE J1760](http://www.standards.its.dot.gov/StdsSummary.asp?ID=316)  [Location Referencing Message Specification (LRMS)   SAE J2266](http://www.standards.its.dot.gov/StdsSummary.asp?ID=419)  [On-Board Land Vehicle Mayday Reporting Interface   SAE J2313](http://www.standards.its.dot.gov/StdsSummary.asp?ID=361)  [Mayday Industry Survey Information Report   SAE J2352](http://www.standards.its.dot.gov/StdsSummary.asp?ID=323)  [Message Set for Advanced Traveler Information System (ATIS)   SAE J2354](http://www.standards.its.dot.gov/StdsSummary.asp?ID=325)  [ITS Data Bus Architecture Reference Model Information Report   SAE J2355](http://www.standards.its.dot.gov/StdsSummary.asp?ID=315)  [Calculation of the Time to Complete In-Vehicle Navigation and Route Guidance Tasks   SAE J2365](http://www.standards.its.dot.gov/StdsSummary.asp?ID=414)  [ITS Data Bus - lDB-C Physical Layer   SAE J2366/1](http://www.standards.its.dot.gov/StdsSummary.asp?ID=319)  [ITS Data Bus - Low Impedance Stereo Audio   SAE J2366/1L](http://www.standards.its.dot.gov/StdsSummary.asp?ID=413)  [ITS Data Bus - Link Layer   SAE J2366/2](http://www.standards.its.dot.gov/StdsSummary.asp?ID=318)  [ITS Data Bus - Thin Transport Layer   SAE J2366/4](http://www.standards.its.dot.gov/StdsSummary.asp?ID=320)  [ITS Data Bus - Application Message Layer   SAE J2366/7](http://www.standards.its.dot.gov/StdsSummary.asp?ID=317)  [Standard for ATIS Message Sets Delivered Over Reduced Bandwidth Media   SAE J2369](http://www.standards.its.dot.gov/StdsSummary.asp?ID=367)  [Field Test Analysis Information Report   SAE J2372](http://www.standards.its.dot.gov/StdsSummary.asp?ID=311)  [Stakeholders Workshop Information Report   SAE J2373](http://www.standards.its.dot.gov/StdsSummary.asp?ID=366)  [ITS In-Vehicle Message Priority   SAE J2395](http://www.standards.its.dot.gov/StdsSummary.asp?ID=321)  [Definitions and Experimental Measures Related to the Specification of Driver Visual Behavior Using Video Based Techniques   SAE J2396](http://www.standards.its.dot.gov/StdsSummary.asp?ID=324)  [Adaptive Cruise Control (ACC) Operating Characteristics and User Interface   SAE J2399](http://www.standards.its.dot.gov/StdsSummary.asp?ID=303)  [Human Factors in Forward Collision Warning Systems: Operating Characteristics and User Interface Requirements   SAE J2400](http://www.standards.its.dot.gov/StdsSummary.asp?ID=312)  [Comparison of GATS Messages to SAE ATIS Standards Information Report   SAE J2539](http://www.standards.its.dot.gov/StdsSummary.asp?ID=308)  [Messages for Handling Strings and Look-Up Tables in ATIS Standards   SAE J2540](http://www.standards.its.dot.gov/StdsSummary.asp?ID=327)  [RDS (Radio Data System) Phrase Lists   SAE J2540/1](http://www.standards.its.dot.gov/StdsSummary.asp?ID=403)  [ITIS (International Traveler Information Systems) Phrase Lists   SAE J2540/2](http://www.standards.its.dot.gov/StdsSummary.asp?ID=401)  [National Names Phrase List   SAE J2540/3](http://www.standards.its.dot.gov/StdsSummary.asp?ID=402)  [Converting ATIS Message Standards from ASN.1 to XML   SAE J2630](http://www.standards.its.dot.gov/StdsSummary.asp?ID=399)  [Dedicated Short Range Communications (DSRC) Message Set Dictionary   SAE J2735](http://www.standards.its.dot.gov/StdsSummary.asp?ID=407)  Turbo Architecture – “Standards Report”  Attached  Unavailable | | | | | |
| **7.4 DOES THE DESIGN INCORPORATE ANY CTDOT STANDARDS**  No  Yes,  IF Yes, Please mention what CTDOT Standards are being used | | | | | |
| **SECTION 8 – Implementation** | | | | | |
| **8.1 PROCUREMENT DETAILS**    (i.e. Competitive Low Bid) | | | | | |
| **8.2 REFERENCE DOCUMENTS (IF ANY)**    Turbo Architecture – “List of Agreements”  Attached  Unavailable | | | | | |
| **SECTION 9 – Integration and Test** | | | | | |
| **9.1 IS THERE AN INTEGRATION PLAN**  No  Yes  To Be Developed  If “Yes” Please provide reference  An Integration Plan as a separate written document is not always needed. The complexity of the system, the complexity of the eventual deployment of the system and the complexity of the development effort, influence the decision to prepare an Integration Plan.  Integration Plan includes and covers integration of all of the components and sub-systems either developed or purchased of the project.  Account for all external systems to be integrated with the system (i.e. communications networks, field equipment and other systems owned by controlling agency.)  An Integration Plan should identify all participants, define what their roles and responsibilities are, establish the sequence - schedule for every integration step and document how integration problems are recorded and resolved. | | | | | |
| **9.2 IS THERE A TEST PLAN**  No  Yes  To Be Developed  If “Yes” Please provide reference | | | | | |
| **SECTION 10 – System Verification and Acceptance** | | | | | |
| **10.1 IS THERE A SYSTEM VERIFICATION AND ACCEPTANCE PLAN (verification of the entire system and acceptance criteria)**  No  Yes  To Be Developed  If “Yes” Please provide reference  (i.e. Signal, Construction checklist) | | | | | |
| **10.2 If Yes, Please fill out the following**  Is there a clear criteria for completion  Yes  No  Are there clear performance metrics for system acceptance  Yes  No  Will there be adequate system documentation for all users and maintainers  Yes  No  If No was checked in above boxes , please provide an explanation | | | | | |
| **SECTION 11 – Operations and Maintenance** | | | | | |
| **11.1 WHO WILL MAINTAIN THE SYSTEM** | | | | | |
| **11.2 IS THERE A SCHEDULE FOR UPGRADES/ENHANCEMENTS TO THE SYSTEM** | | | | | |
| **11.3 WILL THERE BE AN EVALUATION OF THE SYSTEM** | | | | | |