Attachment K

Evaluation Approaches (17 projects)

List of Projects

1. Showcase Kernal Early Start Project
2. Corridorwide System Integration Project
3. Corridorwide ATMS
4. Corridorwide ATIS Project
5. Corridorwide Rideshare Data Exchange Project
6. Corridorwide CVO Project
7. Intermodal Transportation Management Center Project
8. InterCAD Project
9. Mission Valley Monitoring and Information System Project
10. Transit Management System Project
11. Traffic Signal Integration Project
12. IMAJINE Project
13. Integrated Mode-Shift Management System Project
14. Los Angeles Regional Advanced Traveler Information System Project
15. Travel TIP Project
16. Orange County Model Deployment Initiative Project
17. Fontana-Ontario Advanced Traffic Management Information Systems Project

DRAFT

U.S. Department of Transportation
Federal Highway Administration

Showcase Kernel Early Start Project

Evaluation Approach

Southern California ITS Priority Corridor Showcase Program

March 20,1998

Prepared by: Booz*Allen & Hamilton

DISCLAIMER

The purpose of this document is to provide a high level overview of the project and its evaluation. This document will be updated on a regular basis, as new information becomes available. All information provided in this document is believed accurate and current, but is not guaranteed.

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- Project Overview
  - goals and objectives
  - project description
  - relationship to other projects and the Showcase Program
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- Evaluation Overview
  - evaluation goals
  - evaluation objectives and initial measures
  - evaluation activities
  - data collection

THE SHOWCASE KERNEL EARLY START PROJECT IS THE ONLY CORRIDORWIDE EARLY START PROJECT - IT IS THE MEANS TO DEPLOY THE INITIAL KERNELS THROUGHOUT SOUTHERN CALIFORNIA

- The Showcase Kernel Early Start project will provide the integration points for the other seven Early Start projects. These integration points are known as kernels. Four kernels will be located, one in each of the four Southern California regions, coinciding with the Caltrans' Districts:
  - Los Angeles and Ventura Counties (District 7)
  - Inland Empire, consisting of San Bernardino and Riverside Counties (District 8)
  - San Diego County (District 11)
  - Orange County (District 12)
- Early Start projects will be connected to their respective regional kernel. There are four Early Start projects in San Diego, two in Los Angeles/Ventura and one in Orange County. There are no Early Start projects in the Inland Empire.
- The Showcase Kernel Early Start project will also provide for interconnection of the kernels, to form the Showcase Network. The Showcase Network will enable Early Start projects in one region to share data with other Early Start projects in the region or elsewhere in Southern California. It also provides redundancy' in the event that a kernel is taken offline.

THE SHOWCASE KERNEL EARLY START PROJECT MAY BE INCLUDED AS PART OF PHASE 3 OF THE SHOWCASE DESIGN PROJECT

- The Showcase Design Project is comprised of three phases:
  - The first phase was a scoping study.
  - The second phase produced a high level design of interfaces for the Early Start projects, resulting a Showcase kernel prototype demonstration (San Diego, March 1998). The prototype will feature the incident management common service' only.
  - The third phase (commencement is imminent) will produce a high level design of interfaces for Showcase projects subsequent to the Early Start projects.
- The Showcase Kernel Early Start project will enhance the Showcase kernel prototype (developed in the second phase of the Showcase Design Project), by including all common 'services' required by the other seven Early Start projects. Four kernels will be installed, one in each region, by Spring 1999.
- Common 'services' not required by Early Start projects will be added to the four Showcase Kernels at a later stage, i.e., after Spring 1999. These enhanced kernels will be the integration points for all subsequent legacy and new ITS deployments in the Southern California ITS Priority Corridor, in addition to the seven Early Start projects.

THE SHOWCASE KERNEL EARLY START PROJECT WILL PROVIDE PROVIDE THE BASIS FOR INTEGRATION OF EACH OF THE SHOWCASE PROJECTS INTO THE SHOWCASE NETWORK

- Showcase Program (funded projects)
  - All Early Start projects (seven)
  - All 1997/98 approved projects (nine)
- Showcase Program (unfunded projects)
  - Future regional projects funded with Federal ITS dollars.
- Other
  - TBD

THE SHOWCASE KERNEL EARLY START PROJECT SUPPORTS ALL SHOWCASE PROJECTS AND SYSTEMS

SYSTEMS

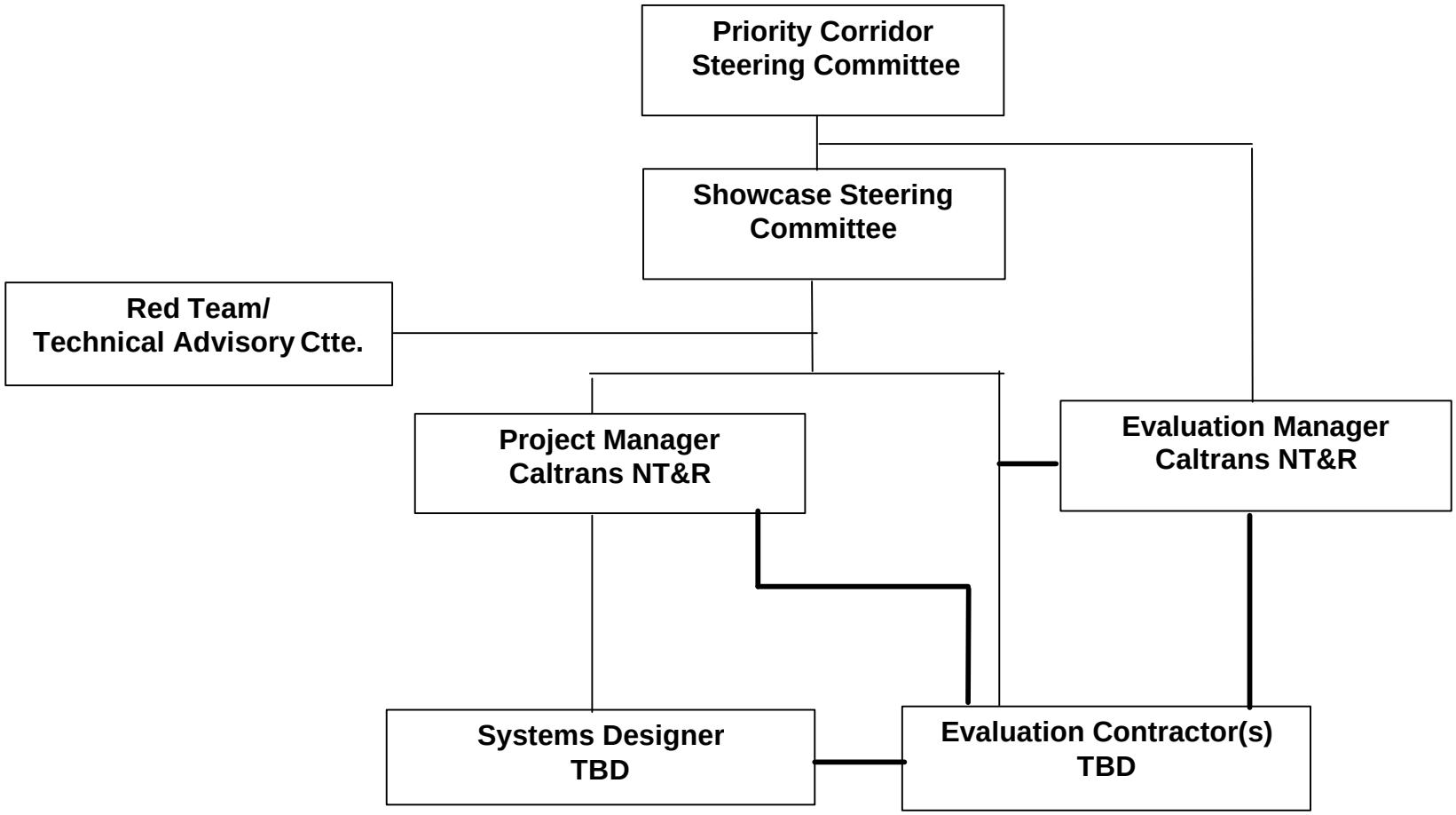
- altrans District 7, 8, II, 12 TMCs
- .All Showcase systems
- *Commercial systems accessing Showcase information
- Showcase network and related infrastructure

MARKET PACKAGES

- Network Surveillance
- Regional Traffic Control
- Incident Management System
- Transit Vehicle Tracking
- Transit Fixed-Route Operations
- Demand Response Transit Operations
- Transit Passenger & Fare Management
- Transit Security
- Multi-modal Coordination
- Broadcast Traveler Information
- Interactive Traveler Information
- Dynamic Route Guidance
- ISP Based Route Guidance
- Emergency Response
- Emergency Routing
- Mayday Support
- HAZMAT Management

Organizational Structure…

THE PROJECT TEAM HAS NOT BEEN FINALIZED – IT IS ASSUMED IT WILL BE LED BY CALTRANS NEW TECHNOLOGY & RESEARCH – ORGANIZATIONAL LINKAGES ARE PROVISIONAL



THE SHOWCASE KERNEL EARLY START PRQJECT AFFECTS ALL SHOWCASE PARTICIPATING AGENCIES

- Caltrans (Sponsor)
- All other Showcase participating agencies

;

THE SHOWCASE KERNEL EARLY START PROJECT WORKPLAN HAS NOT YET BEEN PREPARED

- T B D

Schedule and Status…

A DETATILED PROJECT SCHEDULE IS NOT AVAILABLE

Task Name	1997 J | J | A | S | O | N | D	1998 J | F | M | A | M | J | J | A | S | O | N | D

THE EVALUATION APPROACH FOR THE SHOWCASE KERNEL EARLY START PROJECT IS BASED ON FIVE EVALUATION GOALS DEVELOPED FOR THE SHOWCASE PROGRAM

* Evaluation Goal #1: Assess the performance of the Showcase Program systems
* Evaluation Goal #2: Estimate the costs of the Showcase Program
* Evaluation Goal #3: Assess the institutional impacts of the Showcase Program
* Evaluation Goal #4: Assess the impact of the Showcase Program on management of transportation and traveler information
* Evaluation Goal #5: Evaluate selected transportation system impacts of the Showcase Program projects, including improvements arising from Showcase Program integration

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE

EVALUATION OBJECTIVES	MEASURES
1.1 Document the Showcase Program system development process, including configuration management	1.1.1 Document
1.2 Assess overall system reliability, availability, interoperability, compatibility, ease of use, and scaleability	1.2.1 System Mean-Time-Between-Failures (Failure Defined) 1.2.2 System Availability Equation ("Up Time" and "Down Time" defined) 1.2.3 Degree of System Interoperability as Provided by agency personnel 1.2.4 Assess level of compatibility in physical and operational environment by transportation agency technical staff 1.2.5 Estimate of system ease of use by transportation agency technical staff 1.2.6 Estimate of Scaleability by transportation agency technical staff
1.3 Assess how Showcase Program integration affected deployment of individual Showcase Program projects and their system performance	1.3.1 Document
2.1 Estimate the costs associated with the Showcase Program's "Design Once/ Deploy Often" Philosophy	2.1.1 Actual costs of systems versus estimated costs based on "initial Design Principle" and comparable projects elsewhere
2.2 Estimate Showcase Program operations & Maintenance (O&M) costs	2.2.1 O&M costs annually, based on actual costs six months after system operation start-uo
3.1 Identify the impact of the Showcase Program on the O&M procedures and policies of the participating transportation agencies	3.1.1 Document
3.2 Identify the impact of the Showcase Program on staffing/skill levels and training	3.2.1 Number of O&M staff changes required and/or requested 3.2.2 Estimated and/or actual system training time and costs 3.2.3 Number of additional job classifications created 3.2.4 Chancre in emolovee turnover rate

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
3.3 Document the impacts of emerging standards and a single high level designer concept on the competitive environment	3.3.1 Number of qualified and responsive proposals to system development RFPs 3.3.2 Magnitude of schedule and cost variation in system development 3.3.3 Document number of standards implemented 3.3.4 Number of different firms selected
3.4 Not applicable to Showcase Kernel Early Start	3.4.1 Not applicable to Showcase Kernel Early Start 3.4.2 Not applicable to Showcase Kernel Early Start
3.5 Assess the impact of the Showcase Program on local planning processes, policy development, and mainstreaming of ITS projects	3.51 Assess the impacts of the Showcase Program deployment plans on the local planning process, as perceived by SCAG and SANDAG planners
4. 1Assess the extent of regional and inter-regional transportation and traveler information integration between agencies	4.1 1 Increased information exchanges 4.1.2 Communications improvements, based on information integration, as perceived by agency personnel 4.1.3 Number of new ITS systems architecture data flows implemented
4.2 Assess the utilization of regional and inter-regional transportation and traveler information by agencies	4.2.1 Enhancement of transportation agency performance due to utilization of regional and inter-regional transportation and traveler information, as perceived by agency personnel
1.3 Not applicable to Showcase Kernel Early Start	4.3.1 Not applicable to Showcase Kernel Early Start 4.3.2 Not applicable to Showcase Kernel Early Start

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
5.1 Not applicable to Showcase Kernel Early Start	5.1 1 Not applicable to Showcase Kernel Early Start 51.2 Not applicable to Showcase Kernel Early Start
5.2 Not applicable to Showcase Kernel Early Start	5.2.1 Not applicable to Showcase Kernel Early Start 5.2.2 Not applicable to Showcase Kernel Early Start
5.3 Not applicable to Showcase Kernel Early Start	5.3.1 Not applicable to Showcase Kernel Early Start 5.3.2 Not applicable to Showcase Kernel Early Start 5.3.3 Not applicable to Showcase Kernel Early Start
5.4 Not applicable to Showcase Kernel Early Start	Not applicable to Showcase Kernel Early Start
5.5 Not applicable to Showcase Kernel Early Start	5.5.1 Not applicable to Showcase Kernel Early Start 5.5.2 Not applicable to Showcase Kernel Early Start 5.5.3 Not applicable to Showcase Kernel Early Start 5.5.4 Not applicable to Showcase Kernel Early Start
5.6 Not applicable to Showcase Kernel Early Start	5.6.1 Not applicable to Showcase Kernel Early Start 5.6.2 Not applicable to Showcase Kernel Early Start

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS

* System Development and Performance
  - ➪ Document significant project technical development events, decisions, and trends
  - ➪ Examine system component (hardware and software) technical performance characteristics
  - ➪ Assess project development as part of the overall Showcase Program system integration
* Cost Assessment
  - Document and estimate project cost, based on publicly available data
  - Estimate project cost without the benefit of prior designs
  - Estimate project O&M costs, based on a minimum of 6 months of operations cost data

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

– Institutional Impacts

- Document the impacts and consequences of O&M policy and procedural changes to participating transportation agencies
- Document the requirements for changes in staffing and skills training, and the consequences
- Document the impacts of emerging standards and a single high-level design concept on the competitive environment
- Document and assess the,impacts on motor carrier management of operations and administration

* Management of Transportation and Traveler Information

- Investigate and assess the level and relative magnitude of inter-regional information that results from the project (output and input)
- Determine the level and,relative magnitude of utilization of regional information by the project and from the project

DATA COLLECTION SOURCES HAVE YET TO BE IDENTIFIED

* Existing sources
    - TBD
* New sources
    - TBD

ACTIVITIES EXTERNAL TO THE PROJECT WHICH MAY INFLUENCE DATA COLLECTION HAVE YET TO BE IDENTIFIED

* Construction
    - TBD
* Other
    - TBD

AGENCY DATA ARCHIVAL POLICIES

⇒ TBD

DRAFT

U.S. Department of Transportation
Federal Highway Administration

Corridor-wide System Integration Project

Evaluation Approach

Southern California ITS Priority Corridor Showcase Program

March 24, 1998

Prepared by: Booz*Allen & Hamilton

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THE CORRIDORWIDE SYSTEM INTEGRATION (SI) PROJECT WILL FACILITATE CENTER TO CENTER EXCHANGE OF DATA AND CONTROL FUNCTIONS

- The first goal of the Corridorwide System Integration project is to integrate each of the individual showcase projects into the showcase "system of systems."
- The second goal of the Corridor-wide System Integration project is to develop and initially implement the necessary configuration management to baseline the systems and keep them in alignment.
- The project will provide and maintain interface standards/configuration management and integration support for each of the individual Showcase projects.
- The project will also establish a network definition and develop the common services required to support the network.
- The project will support the readiness review for each of the individual Showcase projects and will test its interfaces prior to integration into the Showcase network.
- The project will update Showcase documentation to reflect each new project and will maintain configuration control over the common services/directory information available over the Showcase network.

THE CORRIDORWIDE SI PROJECT WILL COMPLETE THE SHOWCASE NETWORK THROUGHOUT THE PRIORITY CORRIDOR AND PROVIDE SIX PRIMARY BENEFITS

- Additional projects integrated with existing projects at lower cost and in less time.
- More complete and timely access to data from other projects and systems.
- Core services and tools utilized by multiple projects only developed and implemented once, and supported in a cost-effective and controlled manner.
- Required system management resources (documentation and configuration information) complete, accurate, and easily available.
- System and network services responsive, reliable, and easily maintained.
- Extensive reliance on standards, thus encouraging development of commercial products and services.

THE CORRIDORWIDE SI PROJECT IS RELATED TO OTHER SHOWCASE PROGRAM CORRIDOR-WIDE AND REGIONAL PROJECTS

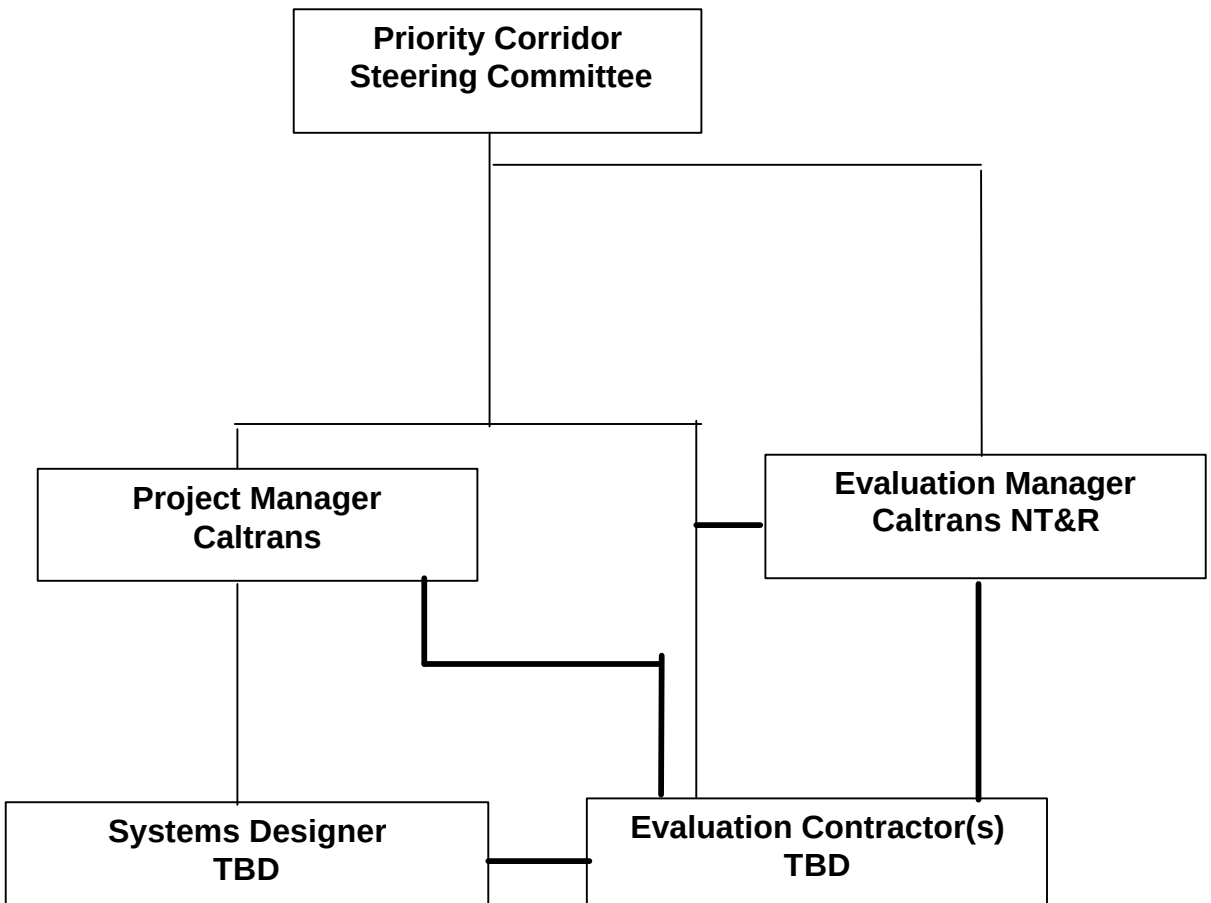
- SHOWCASE Program (funded projects)
  - All funded projects*
- SHOWCASE Program (unfunded projects)
  - TBD
- Other
  - TBD

Note: Projects indicated with a (*) are included in the Showcase Program Evaluation Strategy

THE CORRIDORWIDE SI PROJECT SUPPORTS ALL SHOWCASE PROJECTS AND SYSTEMS

SYSTEMS	MARKET PACKAGES
• Caltrans District 7, 8, II, 12 TMCs • All Showcase systems • Commercial systems accessing Showcase information • Showcase network and related infrastructure	• Network Surveillance • Regional Traffic Control • Incident Management System • Transit Vehicle Tracking • Transit Fixed-Route Operations • Demand Response Transit Operations • Transit Passenger & Fare Management • Transit Security • Multi-modal Coordination • Broadcast Traveler Information • Interactive Traveler Information • Dynamic Route Guidance • ISP Based Route Guidance • Emergency Response • Emergency Routing • Mayday Support • HAZMAT Management

THE PROJECT TEAM IS LED BY CALTRANS – OTHER ORGANIZATIONAL LINKAGES ARE PROVISIONAL



THE CORRIDORWIDE SI PROJECT AFFECTS ALL SHOWCASE PARTICIPATING AGENCIES

- Caltrans (Sponsor)
- All other Showcase participating agencies

THE CORRIDORWIDE SI PROJECT WORKPLAN IS NOT YET DETERMINED - IT IS EXPECTED TO COMPRISE SEVEN MAJOR TASKS

- Task 1.0-Installation and Integration of Showcase Kernels (4)
- Task 2.0-Integration of Showcase Projects to Network Support
- Task 3.0-Showcase Configuration Management
- Task 4.0-Showcase Standards Maintenance
- Task 5.0-Support Project Implementation
- Task 6.0-Showcase Demonstration
- Task 7.0-Support Showcase Evaluation

Schedule and Status.. .

THE CORRIDORWIDE SI PROJECT HAS NOT YET COMMENCED - A DETAILED PROJECT SCHEDULE IS NOT AVAILABLE

Task Name	1999 J J A S O N D	1999 J F M A M J J A S O N D
Task 1.0: install and Integrate Showcase Kernels		
Task 2.0: Integrate Showcase Projects		
Task 3.0: Showcase Configuration Management		
Task 4.0: Showcase Standards Maintenance		
Task 5.0: Support Project Implementation		
Task 6.0: Showcase Demonstration		
Task 7.0: Support Showcase Evaluation		

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INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
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INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
5.1 Not applicable to Corridorwide SI	5.1.1 Not applicable to Corridorwide SI 5.1.2 Not applicable to Corridorwide SI
5.2 Not applicable to Corridorwide SI	5.2.1 Not applicable to Corridorwide SI 5.2.2 Not applicable to Corridotwide SI
5.3 Not applicable to Corridorwide SI	5.3.1 Not applicable to Corridorwide SI 5.3.2 Not applicable to Corridowide SI 5.3.3 Not applicable to Corridorwide SI
5.4 Not applicable to Corridorwide SI	TBD - please refer to the Cross-cutting Analysis Strategy document
5.5 Not applicable to Corridorwide SI	5.5.1 Not applicable to Corridorwide SI 5.5.2 Not applicable to Corridorwide SI 5.5.3 Not applicable to Corridorwide SI 5.5.4 Not applicable to Corridotwide SI
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EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS

* System Development and Performance
  - Document significant project technical development events, decisions, and trends
  - Examine system component (hardware and software) technical performance characteristics
  - Assess project development as part of the overall Showcase Program system integration
* Cost Assessment
  - Document and estimate project cost, based on publicly available data
  - Estimate project cost without the benefit of prior designs
  - Estimate project O&M costs, based on a minimum of 6 months of operations cost data

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Institutional Impacts
  - Document the impacts,and consequences of O&M policy and procedural changes to participating transportation agencies
  - Document the requirements for changes in staffing and skills training, and the consequences
  - Document the impacts of emerging standards and a single high-level design concept on the competitive environment
  - Document and assess the impacts on motor carrier management of operations and administration

* Management of Transportation and Traveler Information
  - Investigate and assess the level and relative magnitude of inter-regional information that results from the project (output and input)
  - Determine the level and relative magnitude of utilization of regional information by the project and from the project

DATA COLLECTION SOURCES HAVE NOT YET BEEN IDENTIFIED

- Existing sources
  ⇒ TBD

- New sources
  ⇒ TBD

ACTIVITIES EXTERNAL TO THE PROJECT WHICH MAY INFLUENCE DATA COLLECTION HAVE NOT YET BEEN IDENTIFIED

* Construction
    . TBD
* Other
    . TBD

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THE CORRIDORWIDE ATMS PROJECT WILL INTEGRATE ADVANCED TRAFFIC MANAGEMENT SYSTEMS FOR FREEWAYS AND SURFACE STREETS THROUGHOUT SOUTHERN CALIFORNIA

- The goal of the Corridorwide ATMS is to provide the means for sharing access to data, video, and control capabilities, and to provide interoperability and coordination between the four Showcase Regions for the coordination of freeway and local street operations.
- The project will develop an architecture that will support the deployment of a corridorwide integrated network of ATMS through the initial integration of Caltrans/CHP transportation management centers (TMCs) at Districts 7 (Los Angeles/Ventura Counties), 1 1(San Diego County), and 12 (Orange County). The integrated Caltrans/CHP TMCs will be the backbone for the purposes of coordinating regional traffic movement during recurring and non-recurring congestion.
- The project will also develop the necessary functional requirements related to the integration of other ATMS'elements such as those of the Early Start projects.
- In future years, this effort will continue to include the integration of the Caltrans District 8 TMC (Riverside and San Bernardino Counties), as well as bringing in additional ATMS candidate elements from other jurisdictions

THE CORRIDORWIDE ATMS PROJECT WILL ACHIEVE FIVE KEY CONCEPTS

- A distributed and integrated network of systems, using the four regional kernels for exchange of data, video feeds, and cross-jurisdictional capabilities.
- Inter-regional coordination and operation between Caltrans/CHP TMCs.
- The foundation for operational coordination between each region and respective local jurisdictions.
- Alignment of the databases of the Caltrans/CHP TMCs, to support coordination of day to day operations.
- Advance the completion of statewide ATMS deployment. Southern California is one of three critical regions identified in the Caltrans/CHP TMC Master Plan.

THE CORRIDORWIDE ATMS PROJECT IS EXPECTED TO HAVE FOUR PRIMARY BENEFITS

- Significant reductions in regional travel times, resulting from early detection of congestion and incidents of a regional nature on the freeways and arterial highways throughout Southern California.
- Improvements to overall levels of travel safety by reducing stop and start conditions inherent with recurring and non-recurring congestion, uncoordinated signal operations, and the lack of interoperability from region to region.
- Development of an integration model which can be applied throughout the corridor by virtue of the use of open systems standards and the use of the Showcase Kernels to achieve the desired level of integration.
- Provide a foundation for the implementation of ITS technologies throughout the corridor by implementing the initial links between regions.

THE CORRIDORWIDE ATMS PROJECT IS RELATED TO OTHER SHOWCASE PROGRAM AND NON-SHOWCASE PROJECTS

- SHOWCASE Program (funded projects)
  - Showcase Kernel Early Start Project*
  - Corridorwide Advanced Traveler Information Systems*
  - Corridorwide Commercial Vehicle Operations*
  - Corridorwide System Integration*
  - Other funded Showcase regional Traffic Management and Traffic Signal Projects*
  - Other funded Showcase regional ATIS Projects*
  - Other funded Showcase regional Traffic/Transit Integration Projects*
- SHOWCASE Program (unfunded projects)
  - Corridor-wide Advanced Public Transportation Systems
- Other
  - TBD

Note: Projects indicated with a (*) are included in the Showcase Program Evaluation Strategy

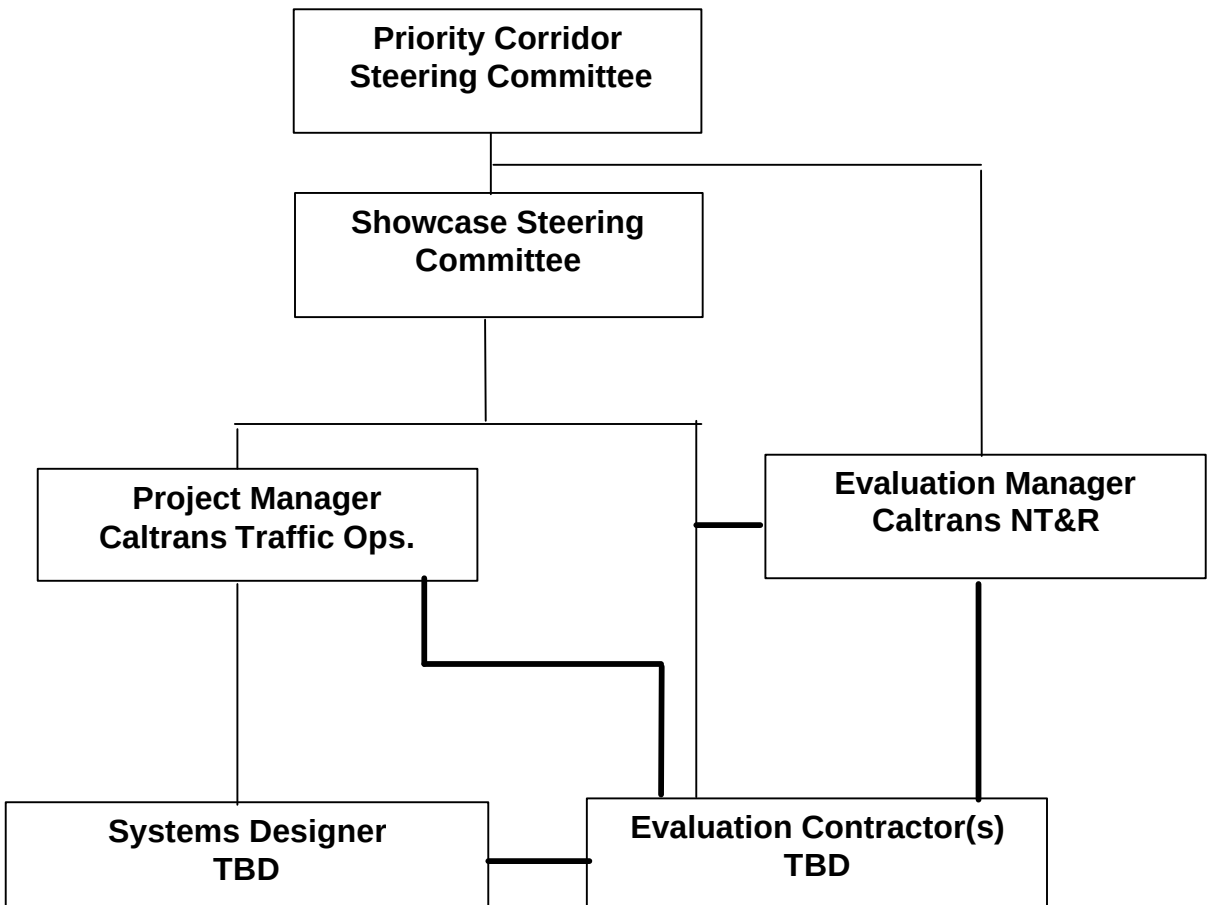
THE CORRIDORWIDE ATMS PROJECT USES A RANGE OF SYSTEMS AND MARKET PACKAGES

SYSTEMS	MARKET PACKAGES
• Caltrans District 7, 8, 11, 12 ATMS (existing; being upgraded) • Local traffic control systems in all four Districts • Others TBD	• Regional Traffic Control • Incident Management System • Emergency Response • Emergency Routing • HAZMAT Management

THE CORRIDORWIDE ATMS PROJECT WILL OPERATE AT SHOWCASE LEVEL FOUR FOR CENTER TO CENTER INTEGRATION OF ADVANCED TRANSPORTATION MANAGEMENT SYSTEMS (ATMS)

- The SHOWCASE Program identified six possible levels of Center to Center integration for ATMS:
  - Level 1: Operate independently.
  - Level 2: Share data/video and single function operation.
  - Level 3: Share data/video and imbed cross-jurisdictional responses for major/special events.
  - Level 4: As Level 3 but on a day to day basis.
  - Level 5: As Level 4 with added redundancies for major disasters.
  - Level 6: Centralize some or all management functions.
- Corridorwide ATMS will operate at Level 4, although it is planned to enhance to Level 5 in the future.

THE PROJECT TEAM IS LED BY CALTRANS – OTHER ORGANIZATIONAL LINKAGES ARE PROVISIONAL



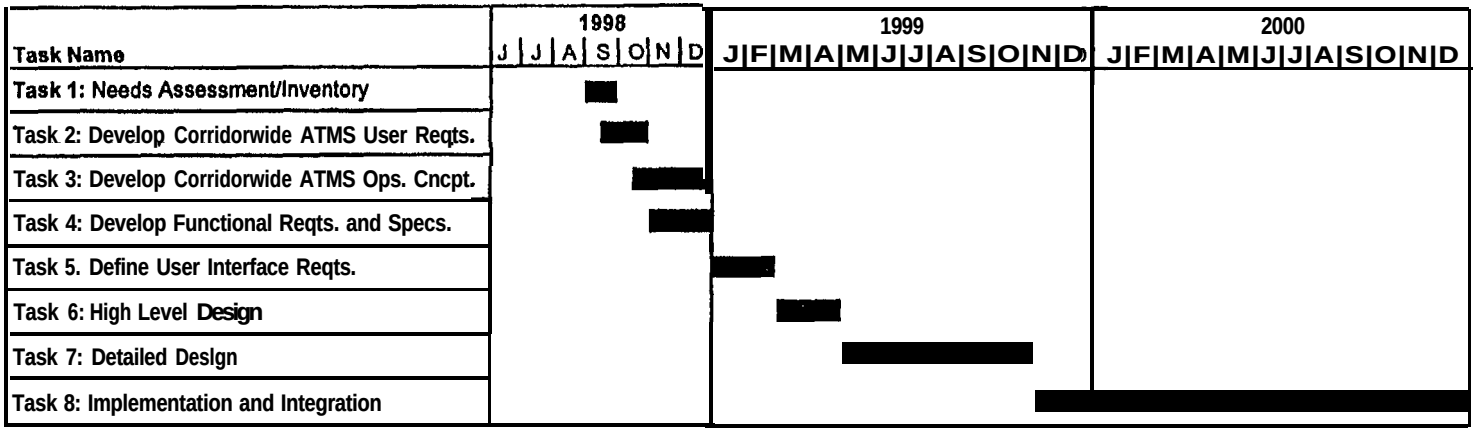
PARTICIPATING AGENCIES HAVE NOT BEEN FULLY DEFINED FOR THE CORRIDORWIDE ATMS PROJECT

- Caltrans (Sponsor)
  - Traffic Operations
  - Districts 7, 8, II, and 1’2
  - New Technology & Research
- Others TBD

THE CORRIDORWIDE ATMS PROJECT WORKPLAN IS COMPRISED OF NINE MAJOR TASKS

- Task 0-Project Management
- Task 1-Needs Assessment/Inventory
- Task 2-Develop the Corridorwide ATMS User Requirements
- Task 3-Develop the CorridorwideATMS Concept of Operations
- Task 4-Develop Functional Requirements and Specifications
- Task 5-Define User Interface Requirements
- Task 6-High Level Design
- Task 7-Detailed Design
- Task 8-Implementation and Integration

THE CORRIDORWIDE ATMS PROJECT HAS NOT YET COMMENCED - THE PROJECT SCHEDULE ASSUMES A SEPTEMBER 1, 1998 KICK-OFF



THE EVALUATION APPROACH FOR CORRIDORWIDE ATMS IS BASED ON FIVE EVALUATION GOALS DEVELOPED FOR THE SHOWCASE PROGRAM

* Evaluation Goal #1: Assess the performance of the Showcase Program systems
* Evaluation Goal #2: Estimate the costs of the Showcase Program
* Evaluation Goal #3: Assess the institutional impacts of the Showcase Program
* Evaluation Goal #4: Assess the impact of the Showcase Program on management of transportation and traveler information
* Evaluation Goal #5: Evaluate selected transportation system impacts of the Showcase Program projects, including improvements arising from Showcase Program integration

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE

EVALUATION OBJECTIVES	MEASURES
1.1 Document the Showcase Program system development process, including configuration management	1.1.1 Document
1.2 Assess overall system reliability, availability, interoperability, compatibility, ease of use, and scaleability	1.2.1 System Mean-Time-Between-Failures (Failure Defined) 1.2.2 System Availability Equation ("Up Time" and "Down Time" defined) 1.2.3 Degree of System Interoperability as Provided by agency personnel 1.2.4 Assess level of compatibility in physical and operational environment by transportation agency technical staff 1.25 Estimate of system ease of use by transportation agency technical staff 1.2.6 Estimate of Scaleability by transportation agency technical staff
1.3 Assess how Showcase Program integration affected deployment of individual Showcase Program projects and their system performance	1.3.1 Document
2.1 Estimate the costs associated with the Showcase Program's "Design Once/ Deploy Often" Philosoohv	2.1 .1 Actual costs of systems versus estimated costs based on "initial Design Principle" and comparable projects elsewhere
2.2 Estimate Showcase Program operations & Maintenance (O&M) costs	2.2.1 O&M costs annually, based on actual costs six months after system operation start-up
3.1 Identify the impact of the Showcase Program on the O&M procedures and policies of the participating transportation agencies	3.1.1 Document
3.2 Identify the impact of the Showcase Program on staffing/skill levels and training	3.2.1 Number of O&M staff changes required and/or requested 3.2.2 Estimated and/or actual system training time and costs 3.2.3 Number of additional job classifications created 3.2.4 Chanae in emolovee turnover rate

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
3.3 Document the impacts of emerging standards and a single high level designer concept on the competitive environment	3.3.1 Number of qualified and responsive proposals to system development RFPs 3.3.2 Magnitude of schedule and cost variation in system development 3.3.3 Document number of standards implemented 3.3.4 Number of different firms selected
3.4 Not applicable to Corridorwide ATMS	3.4.1 Not applicable to Corridorwide ATMS 3.4.2 Not applicable to Corridorwide ATMS
3.5 Assess the impact of the Showcase Program on local planning processes, policy development, and mainstreaming of ITS projects	3.51 Assess the impacts of the Showcase Program deployment plans on the local planning process, as perceived by SCAG and SANDAG planners
4.1 Assess the extent of regional and inter-regional transportation and traveler information integration between agencies	4.1.1 Increased information exchanges 4.1.2 Communications improvements, based on information integration, as perceived by agency personnel 4.1.3 Number of new ITS systems architecture data flows implemented
4.2 Assess the utiljzation of regional and inter-regional transportation and traveler information by agencies	4.2.1 Enhancement of transportation agency performance due to utilization of regional and inter-regional transportation and traveler information, as perceived by agency personnel
4.3 Not applicable to Corridorwide ATMS	4.3.1 Not applicable to Corridotwide ATMS 4.3.2 Not applicable to Corridorwide ATMS

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
5.1Not applicable to Corridorwide ATMS	5,1.1 Not applicable to Corridorwide ATMS 5.1.2 Not applicable to Corridorwide ATMS
5.2 Assess the safety related impacts of the Showcase projects	5.2.1 Decrease in frequency and severity of accidents in target areas during target time periods 5.2.2 Increase in perceived safety benefits by travelers
5.3 Assess the impacts of the Showcase Projects on traffic congestion	5.3.1 Decreases in delay in target areas during target time periods 5.3.2 Increases in average speed in target areas during target time periods 5.3.3 Decreases in number of stops
5.4 Assess the environmental impacts of the Showcase Program	TBD - please refer to the Cross-cutting Analysis Strategy document
5.5 Not applicable to Corridorwide ATMS	5.5.1 Not applicable to Corridorwide ATMS 5.52 Not applicable to Corridorwide ATMS 55.3 Not applicable to Corridorwide ATMS 5.5.4 Not applicable to Corridor-wide ATMS
5.6 Not applicable to Corridotwide ATMS	5.6.1 Not applicable to Corridorwide ATMS 5.6.2 Not applicable to Corridorwide ATMS

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS

* System Development and Performance
  - Document significant project technical development events, decisions, and trends
  - Examine system component (hardware and software) technical performance characteristics
  - Assess project development as part of the overall Showcase Program system integration
* Cost Assessment
  - Document and estimate project cost, based on publicly available data
  - Estimate project cost without the benefit of prior designs
  - Estimate project O&M costs, based on a minimum of 6 months of operations cost data

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Institutional Impacts
  - Document the impacts and consequences of O&M policy and procedural changes to participating transportation agencies
  - Document the requirements for changes in staffing and skills training, and the consequences
  - Document the impacts of emerging standards and a single high-level design concept on the competitive environment
  - Document and assess the impacts on motor carrier management of operations and administration
* Management of Transportation and Traveler Information
  - Investigate and assess the level and relative magnitude of inter-regional information that results from the project (output and input)
  - Determine the level and relative magnitude of utilization of regional information by the project and from the project

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Transportation System impacts
  - Identify and assess traffic congestion impacts at targeted areas and during targeted times
  - Identify and assess the degree of travel mode shifts or other changes in intermodal travel behavior
  - Determine, if possible, any marginal air quality benefits directly measurable from the project
  - Identify and assess transit operations and ridership changes for targeted areas and times
  - Identify and assess any safety benefits directly or indirectly attributable to the system

DATA COLLECTION SOURCES HAVE BEEN IDENTIFIED

* Existing sources
  - Caltrans Districts 7, 8, 11, and 12 volume and occupancy data, collected every 30 seconds, at half mile intervals, and used to calculate average speed
  - Other agencies - TBD
* New sources
  - TBD

ACTIVITIES EXTERNAL TO THE PROJECT WHICH MAY INFLUENCE DATA COLLECTION HAVE NOT YET BEEN IDENTIFIED

* Construction
    - TBD
* Other
    - TBD

AGENCY DATA ARCHIVAL POLICIES

* Caltrans data archived for 12 months
* All other agencies - TBD

DRAFT

U.S. Department of Transportation
Federal Highway Administration

Corridorwide ATIS Project

Evaluation Approach

Southern California ITS Priority Corridor Showcase Program

March 24,1998

*Prepared by: Booz*Allen & Hamilton*

DISCLAIMER

The purpose of this document is to provide a high level overview of the project and its evaluation. This document will be updated on a regular basis, as new information becomes available. All information provided in this document is believed accurate and current, but is not guaranteed.

CONTENTS

- Project Overview
  - goals and objectives
  - project description
  - relationship to other projects and the Showcase Program
  - systems and market packages
- Organizational Structure
- Project Workplan
- Schedule and Status
- Evaluation Overview
  - evaluation goals
  - evaluation objectives and initial measures
  - evaluation activities
  - data collection

THE CORRIDORWIDE ATIS PROJECT WILL ESTABLISH STANDARD TECHNICAL AND OPERATIONAL PRACTICES THROUGHOUT SOUTHERN CALIFORNIA

- The Corridorwide ATIS project will achieve standard technical and operational practices by ensuring the quality and compatibility of informational output from:
  - the TravelTIP Early Start project,
  - the Orange County Model Deployment Initiative project extension of TravelTIP,
  - the Los Angeles/Ventura Regional ATIS project.
- The Corridorwide ATIS project seeks to demonstrate a business model for traveler information at a commercially viable level: The Southern California Media Market. This eminates from the Smart Traveler initiative, which originated in 1990. The Smart Traveler consortium has evolved into the "ATIS Expert Team", under the aegis of the California Alliance for Advanced Transportation Systems (CAATS).
- The vision of Smart Traveler-is to give transportation users access to all the information they need for efficient trip planning and trip making regardless of the preferred mode or system. Smart Traveler will directly support the safe, convenient, efficient, and swift movement of people, goods, services, and information from origin to destination using any available method of transportation whether it is the car, bus, train, or the information super highway.

THE CORRIDORWIDE ATIS PROJECT IS EXPECTED TO PROVIDE FIVE PRIMARY BENEFITS

- Significant reductions in regional travel times resulting from widespread distribution of information concerning traffic congestion and incidents on the freeways and arterial roadways, plus the availability of alternative routes and travel modes throughout the corridor.
- Improvements to overall levels of travel safety by reducing stop and start conditions inherent with travelers lacking timely information on traffic conditions and alternative routes/modes available from region to region.
- Development of an integration model which can be applied throughout the corridor by virtue of the use of open system standards and the use of the Showcase Kernel/Seed architecture to achieve the desired level of integration.
- Provide a foundation for the implementation of ITS technologies throughout the corridor by implementing the initial links between the regions.
- Provide a foundation for the sustainability of ATIS technologies throughout the corridor by coordinating business operational practices and corridorwide business agreements with commercial private sector information service providers.

THE CORRIDORWIDE ATIS PROJECT IS RELATED TO OTHER SHOWCASE PROGRAM AND NON-SHOWCASE PROJECTS

- SHOWCASE Program (funded projects)
  - Corridorwide ATMS*
  - Corridorwide CVO*
  - TravelTl P*
  - Orange County MDI*
  - LA/Ventura Regional Advanced Traveler Information System*
  - Fontana-Ontario ATMIS"
  - Transit Management System*
- SHOWCASE Program (unfunded projects)
  - TBD
- Other
  - Yosemite Area Traveler Information
  - TravInfo Field Operational Test
  - TransCal Field Operational Test

Note: Projects indicated with a (*) are included in the Showcase Program Evaluation Strategy

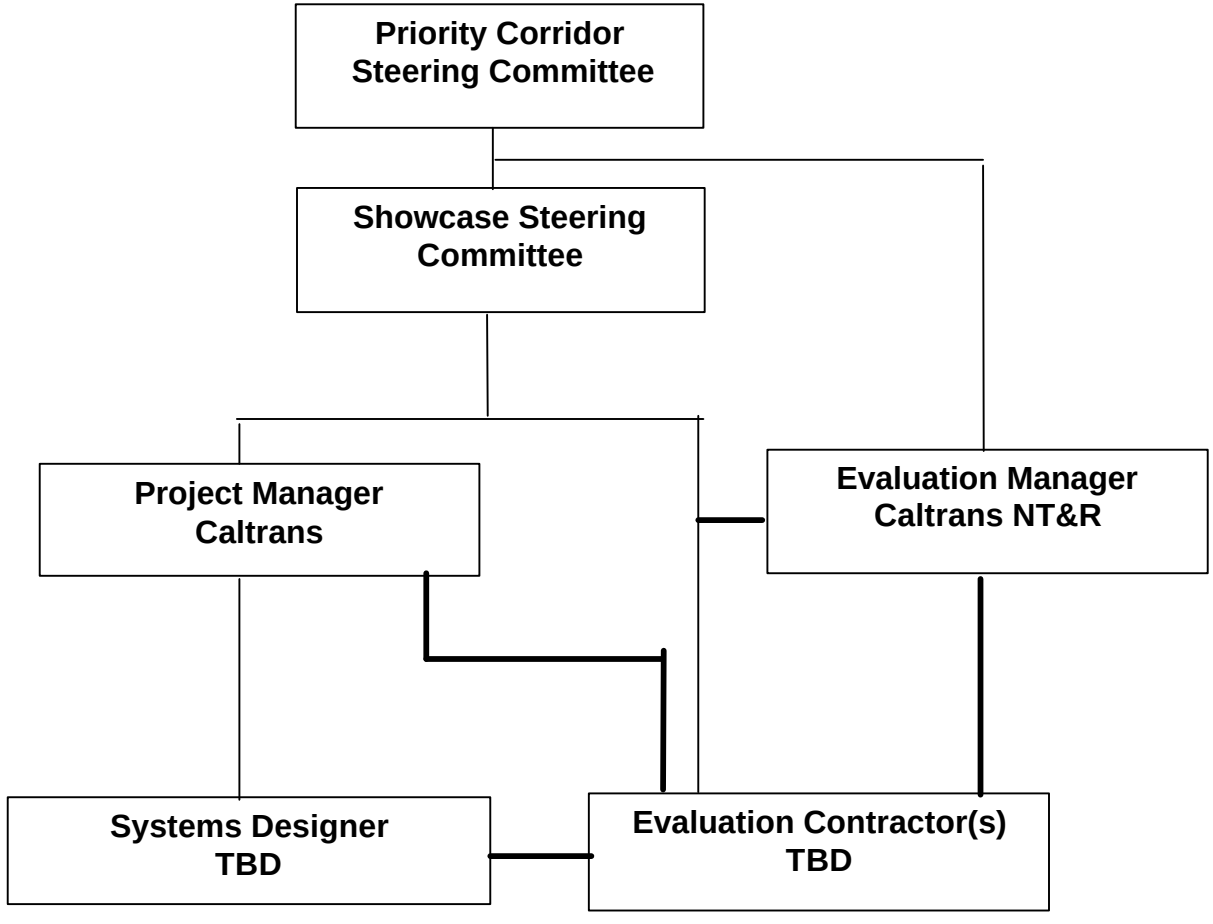
THE CORRIDORWIDE ATIS PROJECT USES A RANGE OF SYSTEMS AND MARKET PACKAGES

SYSTEMS	MARKET PACKAGES
• Caltrans District 7, 8, 11, 12 ATMS (existing; being upgraded) • Others TBD	• Network Surveillance • Incident Management System • Transit Vehicle Tracking • Transit Fixed-Route Operations • Demand Response Transit Operations • Transit Passenger & Fare Management • Broadcast Traveler Information • Interactive Traveler Information • Dynamic Route Guidance • ISP based Route Guidance

THE CORRIDORWIDE ATIS PROJECT WILL OPERATE AT SHOWCASE LEVEL TWO FOR CENTER TO CENTER INTEGRATION OF ADVANCED TRAVELER INFORMATION SYSTEMS (ATIS)

- The SHOWCASE Program identified four possible levels of Center to Center integration for ATIS:
  - Level 1: Fully distributed - loosely coupled - Internet paradigm.
  - Level 2: Fully distributed - tightly coupled - formal configuration management.
  - Level 3: Hierarchical with distinct fusion or assimilation and dispersion points.
  - Level 4: Centralized Travel Information Center for Priority Corridor.
- Corridor-wide ATIS will operate at Level 2.

THE PROJECT TEAM IS LED BY CALTRANS – OTHER ORGANIZATIONAL LINKAGES ARE PROVISIONAL



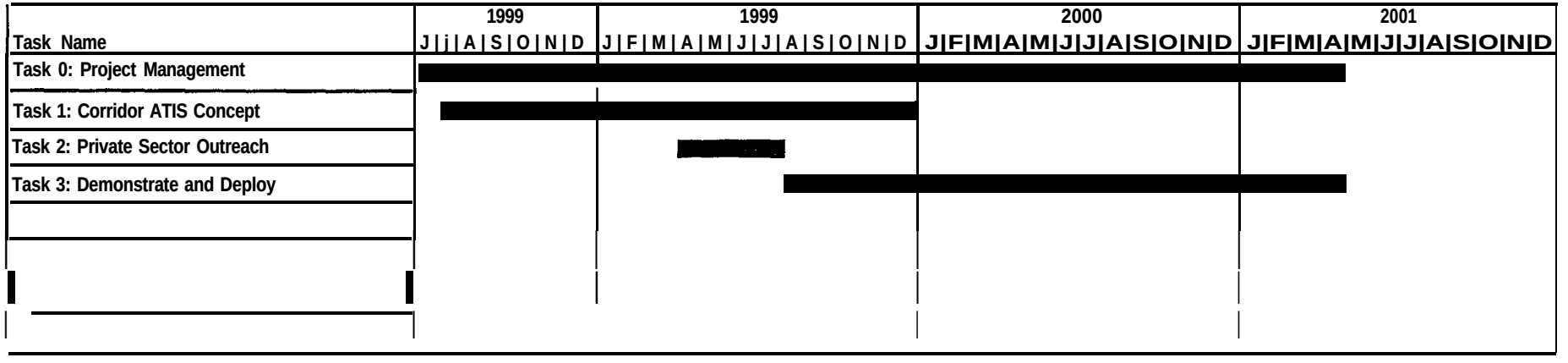
PARTICIPATING AGENCIES HAVE NOT BEEN FULLY DEFINED FOR THE CORRIDORWIDE ATIS PROJECT

- Caltrans (Sponsor)
  - Traffic Operations
  - New Technology & Research
- Smart Traveler Consortium
- Others TBD

THE CORRIDORWIDE ATIS WORKPLAN IS COMPRISED OF FOUR MAJOR TASKS

- Task 0-Project Management
- Task 1-CorridorATIS Concept
- Task 2-Private Sector Outreach
- Task 3-Demonstrate and Deploy

THE CORRIDORWIDE ATIS PROJECT HAS NOT YET COMMENCED - THE PROJECT SCHEDULE ASSUMES A JULY 1, 1998 KICK-OFF



Note: This schedule assumes the Orange County Model Deployment Initiative project, and the Los Angeles/Ventura Regional ATIS project, both commence on July 1,1998, and run for 16 months and 20 months respectively.

THE EVALUATION APPROACH FOR THE CORRIDORWIDE ATIS PROJECT IS BASED ON FIVE EVALUATION GOALS DEVELOPED FOR THE SHOWCASE PROGRAM

` Evaluation Goal #1: Assess the performance of the Showcase Program systems

* Evaluation Goal #2: Estimate the costs of the Showcase Program

* Evaluation Goal #3: Assess the institutional impacts of the Showcase Program

* Evaluation Goal #4: Assess the impact of the Showcase Program on management of transportation and traveler information

* Evaluation Goal #5: Evaluate selected transportation system impacts of the Showcase Program projects, including improvements arising from Showcase Program integration

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE

EVALUATION OBJECTIVES	MEASURES
1.1 Document the Showcase Program system development process, including configuration management	1.1.1 Document
1.2 Assess overall system reliability, availability, interoperability, compatibility, ease of use, and scaleability	1.2.1 System Mean-Time-Between-Failures (Failure Defined) 1.2.2 System Availability Equation ("Up Time" and "Down Time" defined) 1.2.3 Degree of System Interoperability as Provided by agency personnel 1.2.4 Assess level of compatibility in physical and operational environment by transportation agency technical staff 1.2.5 Estimate of system ease of use by transportation agency technical staff 1.2.6 Estimate of Scaleability by transportation agency technical staff
1.3 Assess how Showcase Program integration affected deployment of individual Showcase Program projects and their system performance	1.3.1 Document
2.1 Estimate the costs associated with the Showcase Program's "Design Once/ Deploy Often" Philosophy	2.1.1 Actual costs of systems versus estimated costs based on "initial Design Principle" and comparable projects elsewhere
2.2 Estimate Showcase Program operations & Maintenance (O&M) costs	2.2.1 O&M costs annually, based on actual costs six months after system operation start-up
3.1 Identify the impact of the Showcase Program on the O&M procedures and policies of the participating transportation agencies	3.1.1 Document
3.2 Identify the impact of the Showcase Program on staffing/skill levels and training	3.2.1 Number of O&M staff changes required and/or requested 3.2.2 Estimated and/or actual system training time and costs 3.2.3 Number of additional job classifications created 3.2.4 Change in employee turnover rate

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
3.3 Document the impacts of emerging standards and a single high level designer concept on the competitive environment	3.3.1 Number of qualified and responsive proposals to system development RFPs 3.3.2 Magnitude of schedule and cost variation in system development 3.3.3 Document number of standards implemented 3.3.4 Number of different firms selected
3.4 Document participation by the private sector in the management of transportation and traveler information	3.4.1 Number of private companies involved in Showcase transportation and traveler information management 3.4.2 Number of private company personnel involved in Showcase transportation and traveler information management
3.5 Assess the impact of the Showcase Program on local planning processes, policy development, and mainstreaming of ITS projects	3.5.1 Assess the impacts of the Showcase Program deployment plans on the local planning process, as perceived by SCAG and SANDAG planners
4.1 Assess the extent of regional and inter-regional transportation and traveler information integration between agencies	4.1.1 Increased information exchanges 4.1.2 Communications improvements, based on information integration, as perceived by agency personnel 4.1.3 Number of new ITS systems architecture data flows implemented
4.2 Assess the utilization of regional and inter-regional transportation and traveler information bv agencies	4.2.1 Enhancement of transportation agency performance due to utilization of regional and inter-regional transportation and traveler information, as perceived by agency personnel
4.3 Assess the extent to which comprehensive and seamless traveler information was disseminated to, and used by travelers, including the relative effectiveness of different dissemination technologies	4.3.1 Indications of seamless access and favorable response by users 4.3.2 Indications of ease of access by travelers

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
5.1 Assess mode shift and intermodal impacts	5.1.1 Increase in ridership of public transit in target areas 5.1.2 Increase in traveler tendency to consider mode shift during target time periods
5.2 Assess the safety related impacts of the Showcase projects	5.2.1 Decrease in frequency and severity of accidents in target areas during target time periods 5.2.2 Increase in perceived safety benefits by travelers
5.3 Assess the impacts of the Showcase Projects on traffic congestion	5.3.1 Decreases in delay in target areas during target time periods 5.3.2 Increases in average speed in target areas during target time periods 5.3.3 Decreases in number of stops
5.4 Assess the environmental impacts of the Showcase Program	TBD - please refer to the Cross-cutting Analysis Strategy document
5.5 Assess the impact of the Showcase Program on transit operations	5.51 Increases in ridership and length of trip attributable to Showcase projects 5.5.2 Increases in operational efficiency in targeted areas 5.5.3 Reduction in selected operations costs 5.5.4 Number of staffing changes required
5.6 Not applicable to Corridorwide ATIS	5.6.1 Not applicable to Corridorwide ATIS 5.6.2 Not applicable to Corridorwide ATIS

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS

* System Development and Performance
  - Document significant project technical development events, decisions, and trends
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* Cost Assessment
  - Document and estimate project cost, based on publicly available data
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  - Estimate project O&M costs, based on a minimum of 6 months of operations cost data

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Institutional Impacts
  - Document the impacts and consequences of O&M policy and procedural changes to participating transportation agencies
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  - Document and assess the impacts on motor carrier management of operations and administration
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EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Transportation System Impacts
  - Identify and assess traffic congestion impacts at targeted areas and during targeted times
  - Identify and assess the degree of travel mode shifts or other changes in intermodal travel behavior
  - Determine, if possible, any marginal air quality benefits directly measurable from the project
  - Identify and assess transit operations and ridership changes for targeted areas and times
  - Identify and assess any safety benefits directly or indirectly attributable to the system

DATA COLLECTION SOURCES HAVE BEEN IDENTIFIED

* Existing sources
  - Caltrans, volume and occupancy data, collected every 30 seconds, at half mile intervals, and used to calculate average speed
  - OCTA Transit Probe - TBD
  - All other agencies controlling traffic signal systems - TBD
* New sources
  - TravelTIP

ACTIVITIES EXTERNAL TO THE PROJECT WHICH MAY INFLUENCE DATA COLLECTION HAVE BEEN IDENTIFIED

* Construction
  - Roadwork activity is underway on Interstate-5 in Orange County, near the Los Angeles County Line. Completion is planned in phases between April 1999 and March 2001.
  - HOV lane constructionon Interstate-605 south of State Route-91 in Los Angeles County, to the Orange County Line, is planned for April 1999 through July 2000.
  - SR-91 (SR-57 to I-5) widening is underway
  - SR-55 (SR-22 to SR-91) widening starts in 1998/99
  - El Toro Corridor (SR-91 to Jamboree/I-5) is underway
  - Katella Avenue (Anaheim) widening (I-5 to Harbor)
* Other
  - Disneyland Expansion
  - Amtrak service Expansion
  - Construction of two commuter stations (Laguna Niguel/Mission Viejo and Tustin)
  - Bus service changes

AGENCY DATA ARCHIVAL POLICIES

- TravelTIP will archive data pertaining to:
  - advisories
  - special events
  - system status
  - diagnostics
- TravelTIP will NOT archive data which is already archived by other agencies
- Caltrans data archived for 12 months (by Caltrans)
- All other agencies controlling traffic signal systems do not archive traffic data
- OCTA Transit Probe - TBD

DRAFT

U.S. Department of Transportation
Federal Highway Administration

Corridorwide Rideshare Data Exchange Project

Evaluation Approach

Southern California ITS Priority Corridor Showcase Program

March 24,1998

*Prepared by: Booz*Allen & Hamilton*

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THE CORRIDORWIDE RIDESHARE DATA EXCHANGE (RDE) PROJECT IS ONE OF SIX FUNDED CORRIDORWIDE SHOWCASE PROJECTS

- The goal of the RDE project is to reduce travel by single occupancy vehicles, and increase transit ridership insouthern California. This will be achieved by linking existing rideshare/transit databases maintained separately by the Southern California Association of Governments (SCAG) and the San Diego Association of Governments (SANDAG).
- SCAG is the Metropolitan Planning Organization (MPO) for the counties of Los Angeles, Ventura, Riverside', San Bernardino, and Orange. SANDAG is the MPO for the county of San Diego. The Southern California ITS Priority Corridor is comprised of the urbanized portions of the SCAG and SANDAG areas.
- The RDE project will be supported by an existing (not Showcase) SCAG project, the Regional Transit Database Information Exchange (RTDIE). The RTDIE project is providing the technical and procedural protocols for exchange of data in the SCAG area, and is funded by the South Coast Air Quality Management District.

THE CORRIDORWIDE,RDE PROJECT WILL ENABLE TRAVELERS TO PLAN PERSONALIZED ITINERARIES FOR ALL FIXED ROUTE TRANSIT AND RAIL SERVICES IN SOUTHERN CALIFORNIA

- Los Angeles County Metropolitan Transportation Authority (LACMTA) and Orange County Transportation Authority (OCTA) provide 40 percent of the transit routes in the SCAG area. The remainder of routes are provided by smaller transit providers.
- The RTDIE project links the three primary transit databases in the SCAG area, each of which contains the same data, but on three different mainframes:
  - SCAG (also used by Ventura, Riverside, and San Bernardino counties)
  - Los Angeles County Metropolitan Transportation Authority (LACMTA)
  - Orange County Transportation Authority (OCTA)
- Each agency uses different software to process these data:
  - Transtar (SCAG)
  - PARIS (LACMTA)
  - Trapeze (OCTA)
- The RDE project will additionally link the San Diego database (ManTech/Tidewater Automated Travel Information System - ATIS), and the smaller transit providers throughout the SCAG and SANDAG areas, such that each provider can access the same data.

THE CORRIDORWIDE RDE PROJECT WILL LINK EXISTING DATABASES WITHOUT THE NEED FOR ANY AGENCY TO RE-WRITE SOFTWARE OR TO REVEAL PROPRIETARY INFORMATION

- Travelers who live in the SCAG area, and work in the SANDAG area (or vice versa) cannot currently use existing databases to seek transit, rideshare, and Vanpool options. The RDE project will enable such cross boundary planning.
- All providers will be required to regularly update their route and schedule information. SCAG will provide smaller providers/operators with software to automate this process.

THE CORRIDORWIDE RDE PROJECT IS RELATED TO OTHER SHOWCASE PROGRAM CORRIDOR-WIDE AND REGIONAL PROJECTS

- SHOWCASE Program (funded projects)
  - Integrated Mode-Shift Management Tool (LA/Ventura)*
  - Intermodal Transportation Management Center (San Diego)*
  - Regional Transit Management System (San Diego)*
- SHOWCASE Program (unfunded projects)
  - TBD
- Other
  - RTDIE

Note: Projects indicated with a (*) are included in the Showcase Program Evaluation Strategy

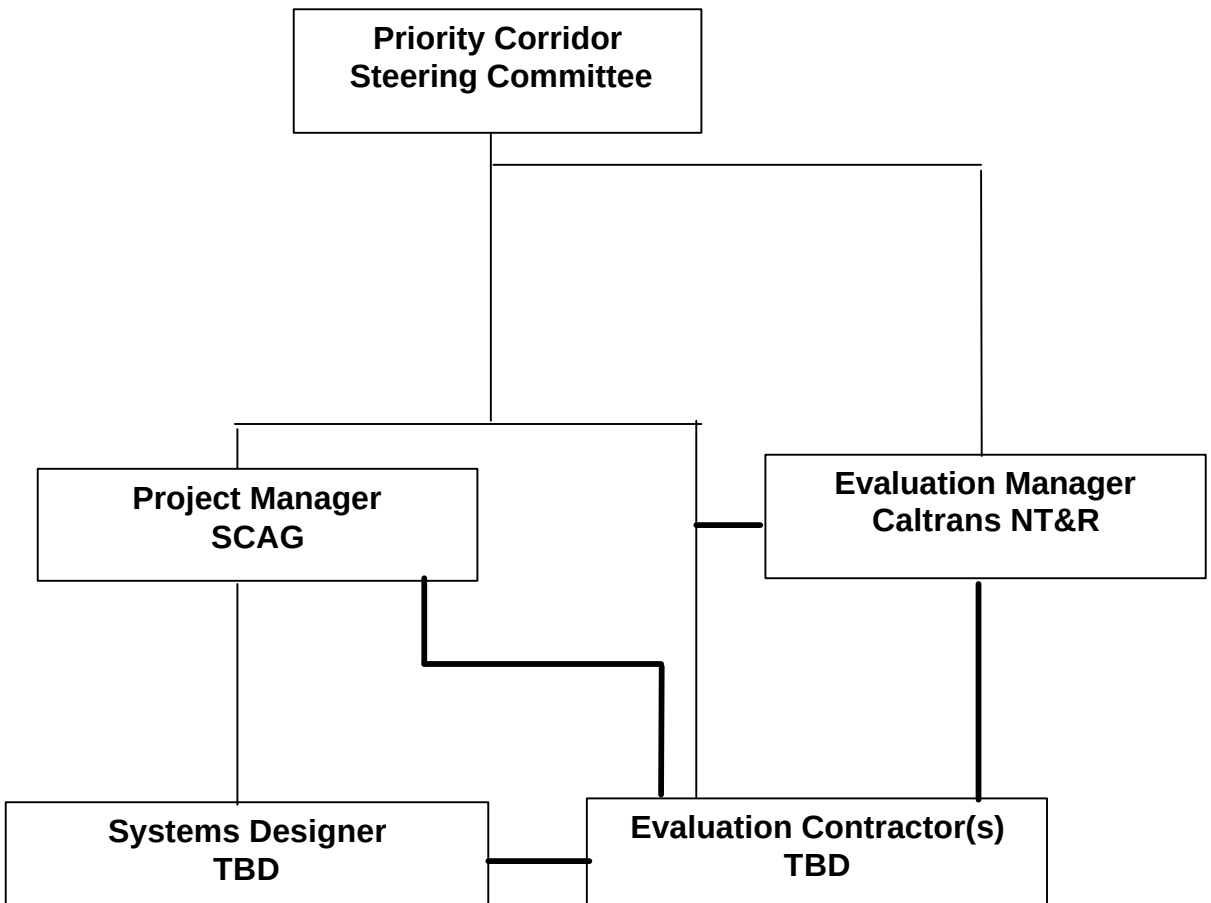
THE CORRIDORWIDE RDE PROJECT USES A RANGE OF SYSTEMS AND MARKET PACKAGES

SYSTEMS	MARKET PACKAGES
• Existing Rideshare systems • Others TBD	• Transit Fixed-Route Operations • Demand Response Transit Operations • Transit Passenger & Fare Management • Multi-modal Coordination • Broadcast Traveler Information • Interactive Traveler Information

THE CORRIDORWIDE RDE PROJECT WILL OPERATE AT SHOWCASE **LEVEL TWO FOR CENTER TO CENTER INTEGRATION OF ADVANCED TRAVELER INFORMATION SYSTEMS (ATIS)**

- The SHOWCASE Program identified four possible levels of Center to Center integration for ATIS:
  - Level 1: Fully distributed - loosely coupled - Internet paradigm.
  - Level 2: Fully distributed - tightly coupled - formal configuration management.
  - Level 3: Hierarchical with distinct fusion or assimilation and dispersion points.
  - Level 4: Centralized Travel Information Center for Priority Corridor.
- Corridorwide RDE will operate at Level 2.

THE PROJECT TEAM IS LED BY SCAG – OTHER ORGANIZATIONAL LINKAGES ARE PROVISIONAL



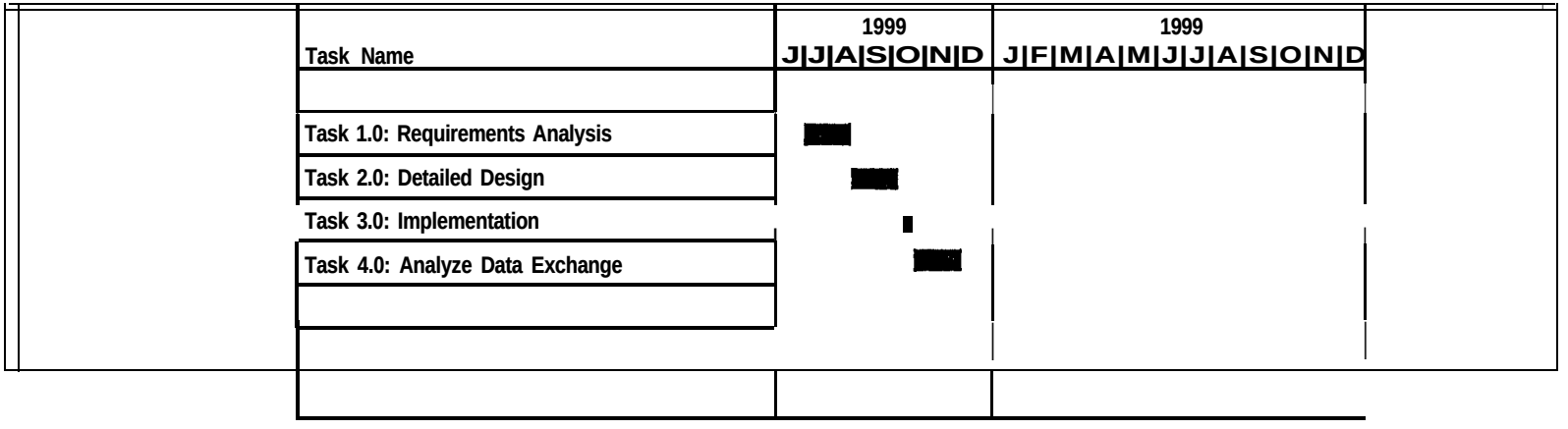
THE CORRIDORWIDE RDE PROJECT HAS THREE PARTICIPATING AGENCIES

- Southern California Association of Governments (Sponsor)
- San Diego Association of Governments
- San Diego Transit

THE CORRIDORWIDE RDE PROJECT IS COMPRISED OF FOUR MAJOR TASKS

- Task 1.0 – Requirements Analysis
- Task 2.0 – Detailed Design
- Task 3.0 – Implementation
- Task 4.0 – Analyze Data Exchange for other SANDAG Transit Providers

THE CORRIDORWIDE RDE PROJECT HAS NOT YET COMMENCED - THE PROJECT SCHEDULE ASSUMES A JULY 1, 1998 KICK-OFF



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EVALUATION OBJECTIVES	MEASURES
1.1 Document the Showcase Program system development process, including configuration management	1.1.1 Document
1.2 Assess overall system reliability, availability, interoperability, compatibility, ease of use, and scaleability	1.2.1 System Mean-Time-Between-Failures (Failure Defined) 1.2.2 System Availability Equation ("Up Time" and "Down Time" defined) 1.2.3 Degree of System Interoperability as Provided by agency personnel 1.2.4 Assess level of compatibility in physical and operational environment by transportation agency technical staff 1.2.5 Estimate of system ease of use by transportation agency technical staff 1.2.6 Estimate of Scaleability by transportation agency technical staff
1.3 Assess how Showcase Program integration affected deployment of individual Showcase Program projects and their system performance	1.3.1 Document
2.1 Estimate the costs associated with the Showcase Program's "Design Once/ Deploy Often" Philosophy -	2.1 .1 Actual costs of systems versus estimated costs based on "initial Design Principle" and comparable projects elsewhere
2.2 Estimate Showcase Program operations & Maintenance (O&M) costs	2.2.1 O&M costs annually, based on actual costs six months after system operation start-up
3.1 Identify the impact of the Showcase Program on the O&M procedures and policies of the participating transportation agencies	3. 1. 1 Document
3.2 Identify the impact of the Showcase Program on staffing/skill levels and training	3.2.1 Number of O&M staff changes required and/or requested 3.2.2 Estimated and/or actual system training time and costs 3.2.3 Number of additional job classifications created 3.2.4 Change in employee turnover rate

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
3.3 Document the impacts of emerging standards and a single high level designer concept on the competitive environment	3.3.1 Number of qualified and responsive proposals to system development RFPs 3.3.2 Magnitude of schedule and cost variation in system development 3.3.3 Document number of standards implemented 3.3.4 Number of different firms selected
3.4 Not applicable to Corridorwide RDE	3.4.1 Not applicable to Corridorwide RDE 3.4.2 Not applicable to Corridorwide RDE
3.5 Assess the impact of the Showcase Program on local planning processes, policy development, and mainstreaming of ITS projects	3.51 Assess the impacts of the Showcase Program deployment plans on the local planning process, as perceived by SCAG and SANDAG planners
4.1 Assess the extent of regional and inter-regional transportation and traveler information integration between agencies	4.1.1 Increased information exchanges 4.1.2 Communications improvements, based on information integration, as perceived by agency personnel 4.1.3 Number of new ITS systems architecture data flows implemented
4.2 Assess the utilization of regional and inter-regional transportation and traveler information bv agencies	4.2.1 Enhancement of transportation agency performance due to utilization of regional and inter-regional transportation and traveler information, as perceived by aaencv oersonnel
4.3 Not applicable to Corridorwide RDE	4.3.1 Not applicable to Corridorwide RDE 4.3.2 Not applicable to Corridorwide RDE

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
5.1 Assess mode shift and intermodal impacts	5.1.1 Increase in ridership of public transit in target areas 5.1.2 Increase in traveler tendency to consider mode shift during target time periods
5.2 Not applicable to Corridorwide RDE	5.2.1 Not applicable to Corridorwide RDE 5.2.2 Not applicable to Corridorwide RDE
5.3 Assess the impacts of the Showcase Projects on traffic congestion	5.3.1 Decreases in delay in target areas during target time periods 5.3.2 Increases in average speed in target areas during target time periods 5.3.3 Decreases in number of stops
5.4 Assess the environmental impacts of the Showcase Program	TBD - please refer to the Cross-cutting Analysis Strategy document
5.5 Assess the impact of the Showcase Program on transit operations	5.5.1 Increases in ridership and length of trip attributable to Showcase projects 5.5.2 Increases in operational efficiency in targeted areas 5.5.3 Reduction in selected operations costs 5.5.4 Number of staffing changes required
5.6 Not applicable to Corridorwide RDE	5.6.1 Not applicable to Corridorwide RDE 5.6.2 Not applicable to Corridorwide RDE

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS

* System Development and Performance
  - Document significant project technical development events, decisions, and trends
  - Examine system component (hardware and software) technical performance characteristics
  - Assess project development as part of the overall Showcase Program system integration

* Cost Assessment
  - Document and estimate project cost, based on publicly available data
  - Estimate project cost without the benefit of prior designs
  - Estimate project O&M costs, based on a minimum of 6 months of operations cost data

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Institutional Impacts
  - Document the impacts and consequences of O&M policy and procedural changes to participating transportation agencies
  - Document the requirements for changes in staffing and skills training, and the consequences
  - Document the impacts of emerging standards and a single high-level design concept on the competitive environment
  - Document and assess the impacts on motor carrier management of operations and administration
* Management of Transportation and Traveler Information
  - Investigate and assess the level and relative magnitude of inter-regional information that results from the project (output and input)
  - Determine the level and relative magnitude of utilization of regional information by the project and from the project

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Transportation System Impacts
  - Identify and assess traffic congestion impacts at targeted areas and during targeted times
  - Identify and assess the degree of travel mode shifts or other changes in intermodal travel behavior
  - Determine, if possible, any marginal air quality benefits directly measurable from the project
  - Identify and assess transit operations and ridership changes for targeted areas and times
  - Identify and assess any safety benefits directly or indirectly attributable to the system

DATA COLLECTION SOURCES HAVE NOT YET BEEN IDENTIFIED

* Existing sources
    - TBD
* New sources
    - TBD

ACTIVITIES EXTERNAL TO THE PROJECT WHICH MAY INFLUENCE DATA COLLECTION HAVE NOT YET BEEN IDENTIFIED

* Construction
    - TBD
* Other
    - TBD

AGENCY DATA ARCHIVAL POLICIES

> TBD

DRAFT

U.S. Department of Transportation
Federal Highway Administration

Corridotwide CVO Project

Evaluation Approach

Southern California ITS Priority Corridor Showcase Program

March 24,1998

*Prepared by: Booz*Allen & Hamilton*

DISCLAIMER

The purpose of this document is to provide a high level overview of the project and its evaluation. This document will be updated on a regular basis, as new information becomes available. All information provided in this document is believed accurate and current, but is not guaranteed.

CONTENTS

- Project Overview
  - goals and objectives
  - project description
  - relationship to other projects and the Showcase Program
  - systems and market packages
- Organizational Structure
- Project Workplan
- Schedule and Status
- Evaluation Overview
  - evaluation goals
  - evaluation objectives and initial measures
  - evaluation activities
  - data collection

THE CORRIDORWIDE CVO PROJECT WILL PROVIDE A TRAVELER INFORMATION SYSTEM FOR THE COMMERCIAL VEHICLE OPERATIONS COMMUNITY IN SOUTHERN CALIFORNIA

- The Corridorwide CVO project will be tailored to suit the needs of commercial vehicle operators, shippers, brokers, port operators, and others who do business in the corridor. Travel and route information will be delivered using wire and wireless media.
- It is envisioned that messages could be provided to a vehicle or office receiver at inspection sites, international border crossings, seaports, airport facilities, and truck stops.
- The project will be conducted in two phases:
  - phase 1 will include development and approval of a deployment plan, with a contractor preparing the plan and establishing a public/private partnership.
  - phase 2 will include the actual demonstration: installation, integration, system test, operation, maintenance, day to day management, and preparation of reports.

THE CORRIDORWIDE CVO PROJECT WILL MEET IDENTIFIED NEEDS TO IMPROVE TRAVELER INFORMATION FOR THE CVO COMMUNITY

- The Commercial Vehicle and International Border Crossing deployment planning study undertaken as a part of the Southern California Strategic Deployment Plan identified seven primary needs for CVO traveler information:
  - timely and accurate reporting of roadway congestion, incidents, and special events, by specific segments,
  - alternative routes and CVO restrictions, such as hazardous materials and oversize/overweight,
  - support services and location information (yellow pages) as well as parking information,
  - "Just in Time" pickup and delivery' container status and queue lengths at ports,
  - CVO regulatory and enforcement information,
  - safety alerts,
  - roadway conditions and weather

THE CORRIDORWIDE CVO PROJECT IS EXPECTED TO PROVIDE NINE PRIMARY BENEFITS

- Improved productivity and reduced travel time, fuel consumption and pollutant emissions resulting from improved scheduling and routing.
- Better availability of information to CVO drivers on the location of roadside services, parking etc.
- Increased deployment of technology in ATIS applications that may be applicable to private vehicles as well as commercial vehicles.
- Reduced number of incidents and reduced time necessary for incident response/cleanup.
- Safer road conditions and reduced travel time for motorists.
- Near term implementation and validation of the IMTMC concept.
- Opportunity to link the project with other initiatives into a nationwide, market-based demonstration of CVO-ATIS user services.
- Complementary to existing and proposed west coast Federal operational tests.
- Opportunity to integrate other CVO projects in the region into the Priority Corridor/Showcase network and architecture.

THE CORRIDORWIDE CVO PROJECT IS RELATED TO OTHER SHOWCASE PROGRAM CORRIDORWIDE AND REGIONAL PROJECTS

- SHOWCASE Program (funded projects)
  - Corridor-wide ATMS*
  - Corridorwide ATIS*
  - TravelTl P*
  - Orange County MDI*
  - LA/Ventura Regional Advanced Traveler Information System*
  - Fontana-Ontario ATMIS*
  - IMTMC*
- SHOWCASE Program (unfunded projects)
  - TBD
- Other
  - TBD

Note: Projects indicated with a (*) are included in the Showcase Program Evaluation Strategy

THE CORRIDORWIDE CVO PROJECT WILL ESTABLISH A STANDARD TO BE USED BY ALL SHOWCASE CVO PROJECTS

SYSTEMS

- Caltrans D7,8,1 1,12 TMCs
- Others TBD

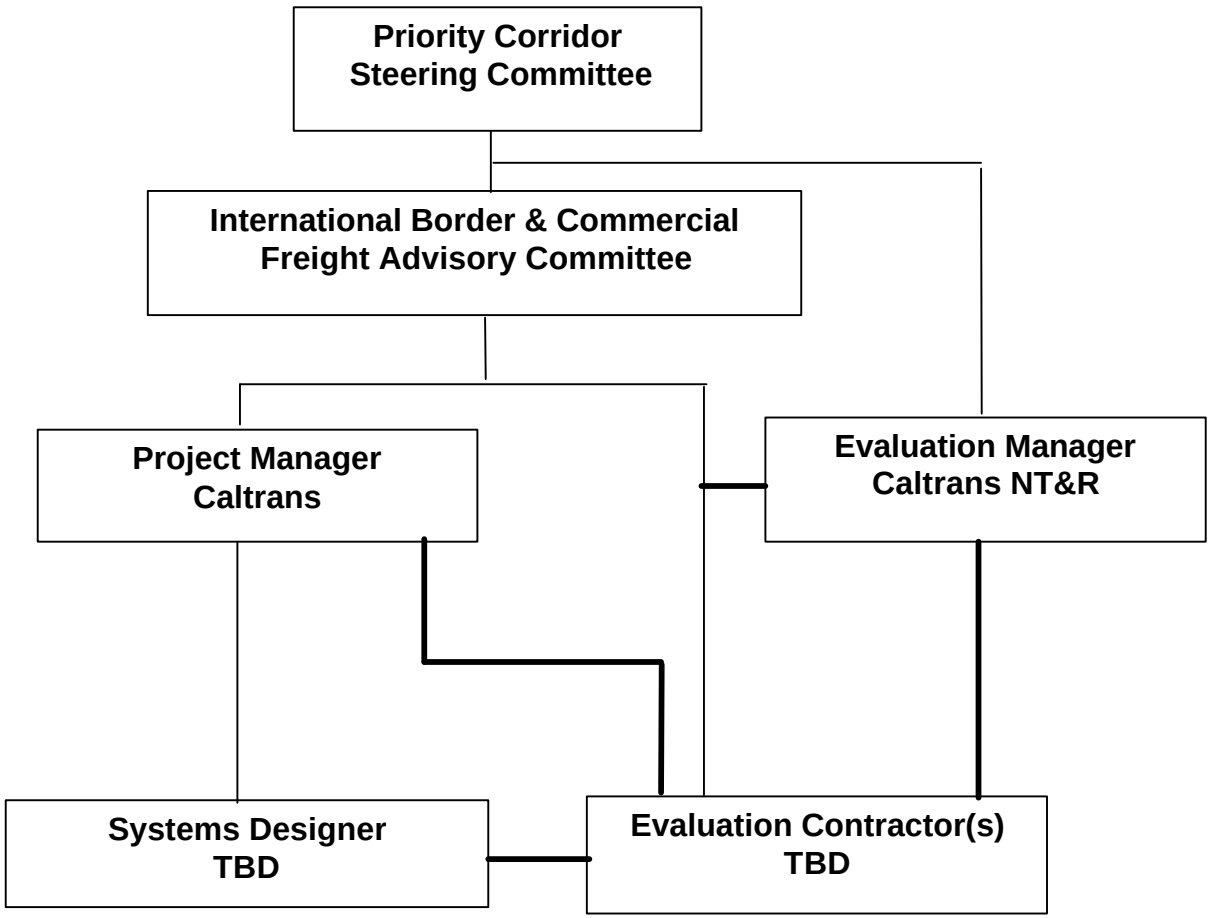
MARKET PACKAGES

- Network Surveillance
- Incident Management System
- Multimodal Coordination
- Broadcast Traveler Information
- Interactive Traveler Information
- Dynamic Route Guidance
- ISP based Route Guidance
- Emergency Response
- Mayday Support
- HAZMAT Management

THE CORRIDORWIDE CVO PROJECT WILL OPERATE AT SHOWCASE LEVEL TWO FOR CENTER TO CENTER INTEGRATION OF ADVANCED TRAVELER INFORMATION SYSTEMS (ATIS)

- The SHOWCASE Program identified four possible levels of Center to Center integration for ATIS:
  - Level 1: Fully distributed - loosely coupled - Internet paradigm.
  - Level 2: Fully distributed - tightly coupled - formal configuration management.
  - Level 3: Hierarchical with distinct fusion or assimilation and dispersion points.
  - Level 4: Centralized Travel Information Center for Priority Corridor.
- Corridorwide CVO will operate at Level 2.

THE PROJECT TEAM IS LED BY CALTRANS – OTHER ORGANIZATIONAL LINKAGES ARE PROVISIONAL



CALTRANS IS THE LEAD AGENCY FOR THE CORRIDORWIDE CVO PROJECT

- Caltrans (Sponsor)
- San Diego Association of Governments
- California Trucking Association
- Others TBD

THE CORRIDORWIDE CVO PHASE 1 WORKPLAN IS COMPRISED OF SIX MAJOR TASKS

Phase 1(Development and Approval of the Deployment Plan)

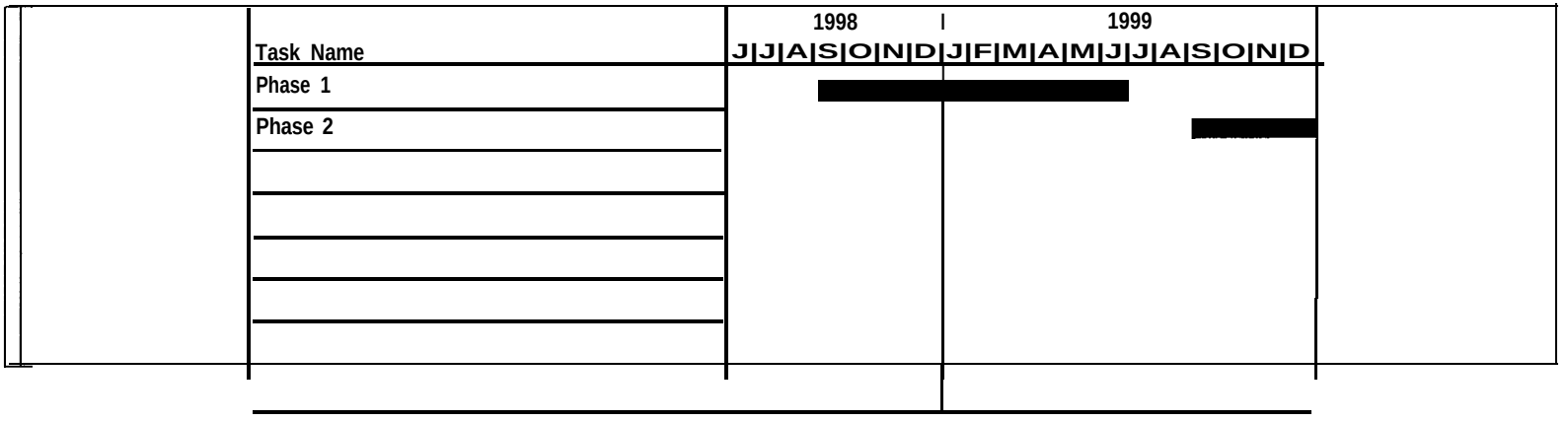
- Task 0.0-Coordination/Management/Support
- Task 1.0-Scope of Work
- Task 2.0-Partnering
- Task 3.0-User and System Requirements
- Task 4.0-High Level Design
- Task 5.0-Deployment Plan

THE CORRIDORWIDE CVO PHASE 2 WORKPLAN IS COMPRISED OF SIX MAJOR TASKS

Phase 2 (Implementation)

- Task 6.0-Technology Transfer/Outreach
- Task 7.0-Detailed Design
- Task 8.0-Prototype Implementation
- Task 9.0-Prototype Operations and Evaluation
- Task 10.0-Final Design Implementation
- Task 11.0-Program Management, Operations and Maintenance

THE CORRIDORWIDE CVO PROJECT HAS NOT YET COMMENCED · THE PROJECT SCHEDULE ASSUMES A SEPTEMBER 1, 1998 KICK-OFF



Note: Phase 2 is expected to continue until March 2003.

THE EVALUATION APPROACH FOR THE CORRIDORWIDE CVO PROJECT IS BASED ON FIVE EVALUATION GOALS DEVELOPED FOR THE SHOWCASE PROGRAM

- Evaluation Goal #1: Assess the performance of the Showcase Program systems
- Evaluation Goal #2: Estimate the costs of the Showcase Program
- Evaluation Goal #3: Assess the institutional impacts of the Showcase Program
- Evaluation Goal #4: Assess the impact of the Showcase Program on management of transportation and traveler information
- Evaluation Goal #5: Evaluate selected transportation system impacts of the Showcase Program projects, including improvements arising from Showcase Program integration

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE

EVALUATION OBJECTIVES	MEASURES
1.1 Document the Showcase Program system development process, including configuration management	1.1.1 Document
1.2 Assess overall system reliability, availability, interoperability, compatibility, ease of use, and scaleability	1.2.1 System Mean-Time-Between-Failures (Failure Defined) 1.2.2 System Availability Equation ("Up Time" and "Down Time" defined) 1.2.3 Degree of System Interoperability as Provided by agency personnel 1.2.4 Assess level of compatibility in physical and operational environment by transportation agency technical staff 1.2.5 Estimate of system ease of use by transportation agency technical staff 1.2.6 Estimate of Scaleability by transportation agency technical staff
1.3 Assess how Showcase Program integration, affected deployment of individual Showcase Program projects and their system performance	1.3.1 Document
2.1 Estimate the costs associated with the Showcase Program's "Design Once/ Deolov Often" Philosoohv	2.1 .1 Actual costs of systems versus estimated costs based on "initial Design Principle" and comparable projects elsewhere
2.2 Estimate Showcase Program operations & Maintenance (O&M) costs	2.2.1 O&M costs annually, based on actual costs six months after system operation start-up
3.1 Identify the impact of the Showcase Program on the O&M procedures and policies of the participating transportation agencies	3.1.1 Document
3.2 Identify the impact of the Showcase Program on staffing/skill levels and training	3.2.1 Number of O&M staff changes required and/or requested 3.2.2 Estimated and/or actual system training time and costs 3.2.3 Number of additional job classifications created 3.2.4 Change in employee turnover rate

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
3.3 Document the impacts of emerging standards and a single high level designer concept on the competitive environment	3.3.1 Number of qualified and responsive proposals to system development RFPs 3.3.2 Magnitude of schedule and cost variation in system development 3.3.3 Document number of standards implemented 3.3.4 Number of different firms selected
3.4 Document participation by the private sector in the management of transportation and traveler information	3.4.1 Number of private companies involved in Showcase transportation and traveler information management 3.4.2 Number of private company personnel involved in Showcase transportation and traveler information management
3.5 Assess the impact of the Showcase Program on local planning processes, policy development, and mainstreaming of ITS projects	3.5.1 Assess the impacts of the Showcase Program deployment plans on the local planning process, as perceived by SCAG and SANDAG planners
4.1 Assess the extent of regional and inter-regional transportation and traveler information integration between agencies	4.1.1 Increased information exchanges 4.1.2 Communications improvements, based on information integration, as perceived by agency personnel 4.1.3 Number of new ITS systems architecture data flows implemented
4.2 Assess the utilization of regional and inter-regional transportation and traveler information by agencies	4.2.1 Enhancement of transportation agency performance due to utilization of regional and inter-regional transportation and traveler information, as perceived by agency personnel
4.3 Assess the extent to which comprehensive and seamless traveler information was disseminated to, and used by travelers, including the relative effectiveness of different dissemination technologies	4.3.1 Indications of seamless access and favorable response by users 4.3.2 Indications of ease of access by travelers

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
5.1 Not applicable to Corridorwide CVO	5.1.1 Not applicable to Corridorwide CVO 5.1.2 Not applicable to Corridorwide CVO
5.2 Assess the safety related impacts of the Showcase projects	5.2.1 Decrease in frequency and severity of accidents in target areas during target time periods 5.2.2 Increase in perceived safety benefits by travelers
5.3 Assess the impacts of the Showcase Projects on traffic congestion	5.3.1 Decreases in delay in target areas during target time periods 5.3.2 Increases in average speed in target areas during target time periods 5.3.3 Decreases in number of stops
5.4 Assess the environmental impacts of the Showcase Program	TBD - please refer to the Cross-cutting Analysis Strategy document
5.5 Not applicable to Corridorwide CVO	5.5.1 Not applicable to Corridorwide CVO 5.5.2 Not applicable to Corridorwide CVO 5.53 Not applicable to Corridorwide CVO 5.5.4 Not applicable to Corridorwide CVO
5.6 Assess the impact of the Showcase Program on commercial vehicle operations	5.6.1 Indications of improved operations by participating carriers 5.6.2 Indications of improved operations by enforcement and regulatory agencies

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS

* System Development and Performance
  - Document significant project technical development events, decisions, and trends
  - Examine system component (hardware and software) technical performance characteristics
  - Assess project development as part of the overall Showcase Program system integration
* Cost Assessment
  - Document and estimate project cost, based on publicly available data
  - Estimate project cost without the benefit of prior designs
  - Estimate project O&M costs, based on a minimum of 6 months of operations cost data

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Institutional Impacts
  - Document the impacts and consequences of O&M policy and procedural changes to participating transportation agencies
  - Document the requirements for changes in staffing and skills training, and the consequences
  - Document the impacts of emerging standards and a single high-level design concept on the competitive environment
  - Document and assess the impacts on motor carrier management of operations and administration
* Management of Transportation and Traveler Information
  - Investigate and assess the level and relative magnitude of inter-regional information that results from the project (output and input)
  - Determine the level and relative magnitude of utilization of regional information by the project and from the project

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Transportation System Impacts
  - Identify and assess traffic congestion impacts at targeted areas and during targeted times
  - Identify and assess the degree of travel mode shifts or other changes in intermodal travel behavior
  - Determine, if possible, any marginal air quality benefits directly measurable from the project
  - Identify and assess transit operations and ridership changes for targeted areas and times
  - Identify and assess any safety benefits directly or indirectly attributable to the system

DATA COLLECTION SOURCES HAVE NOT YET BEEN IDENTIFIED

* Existing sources
    - TBD
* New sources
    - TBD

ACTIVITIES EXTERNAL TO THE PROJECT WHICH MAY INFLUENCE DATA COLLECTION HAVE NOT YET BEEN IDENTIFIED

* Construction
    - TBD
* Other
    - TBD

AGENCY DATA ARCHIVAL POLICIES

* Caltrans data archived for 12 months (by Caltrans)
* Other agencies - TBD

DRAFT

U.S. Department of Transportation
Federal Highway Administration

Intermodal Transportation Management Center Project

Evaluation Approach

Southern California ITS Priority Corridor Showcase Program

March 20,1998

Prepared by: Booz*Allen & Hamilton

DISCLAIMER

The purpose of this document is to provide a high level overview of the project and its evaluation. This document will be updated on a regular basis, as new information becomes available. All information provided in this document is believed accurate and current, but is not guaranteed.

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  - data collection

THE INTERMODAL TRANSPORTATION MANAGEMENT CENTER (IMTMC) PROJECT WILL BE ONE OF FOUR EARLY START SHOWCASE PROJECTS IN THE SAN DIEGO REGION

- The goal of the IMTMC project is to optimize and coordinate freeway and surface street operations with public and private transportation systems, by the integration of intermodal transportation information, and intermodal transportation management systems.
- The IMTMC project is the pivotal project in the San Diego Region. When integrated with the other projects in the San Diego Region, it will form a regional microcosm of the Showcase Program.
- The Caltrans District 11 TMC will be the location of the IMTMC. The IMTMC will exchange information with all modes of the region's Intermodal Transportation Management System (IMTMS), consisting of freeway management, arterial streets management, transit management, public safety management, commercial vehicle operations, incident management, and advanced traveler information systems.
- Caltrans' vision is that all of its TMCs will migrate toward a unified Advanced Traffic Management System. The IMTMC project is expected to be the model for future TMC developments in California.

THE IMTMC PROJECT HAS TWO PHASES - THE CULMINATION OF THE FIRST PHASE WILL INCLUDE A REGIONAL MEMORANDUM OF UNDERSTANDING (MOU) BETWEEN THE PARTNERS

- Phase 1 encompasses requirements analysis (user, system, and graphical user interface), and high level design, in addition to the regional MOU.
- Phase 1 will also develop user requirements for two other Showcase projects in the San Diego Region:
  - Regional Transit Management System (San Diego)
  - Regional Traffic Signal Coordination (San Diego)
- Phase 2 encompasses detailed design, prototype development and test, prototype operations, and final system implementation.
- The IMTMC project organizational structure includes subgroups for:
  - Transit
  - Incident Management
  - Advanced Traveler Information Systems
  - CVO/Borders
  - Traffic systems
  - Communications
  - InterCAD

THE IMTMC PROJECT IS RELATED TO OTHER SHOWCASE PROGRAM CORRIDOR-WIDE AND REGIONAL PROJECTS

- SHOWCASE Program (funded projects)
  - InterCAD (San Diego)*
  - Mission Valley Monitoring and Information System (San Diego)*
  - Regional Transit Management System (San Diego)*
  - Regional Traffic Signal Coordination (San Diego)*
  - Corridor-wide Commercial Vehicle Operations*
  - TravelTIP (Orange County)*
- SHOWCASE Program (unfunded projects)
  - InterCAD Expansion (San Diego)
  - Regional Transit Management System Expansion (San Diego)
  - Regional Advanced Traveler Information System (San Diego)
- Other
  - TBD

Note: Projects indicated with a (*) are included in the Showcase Program Evaluation Strategy

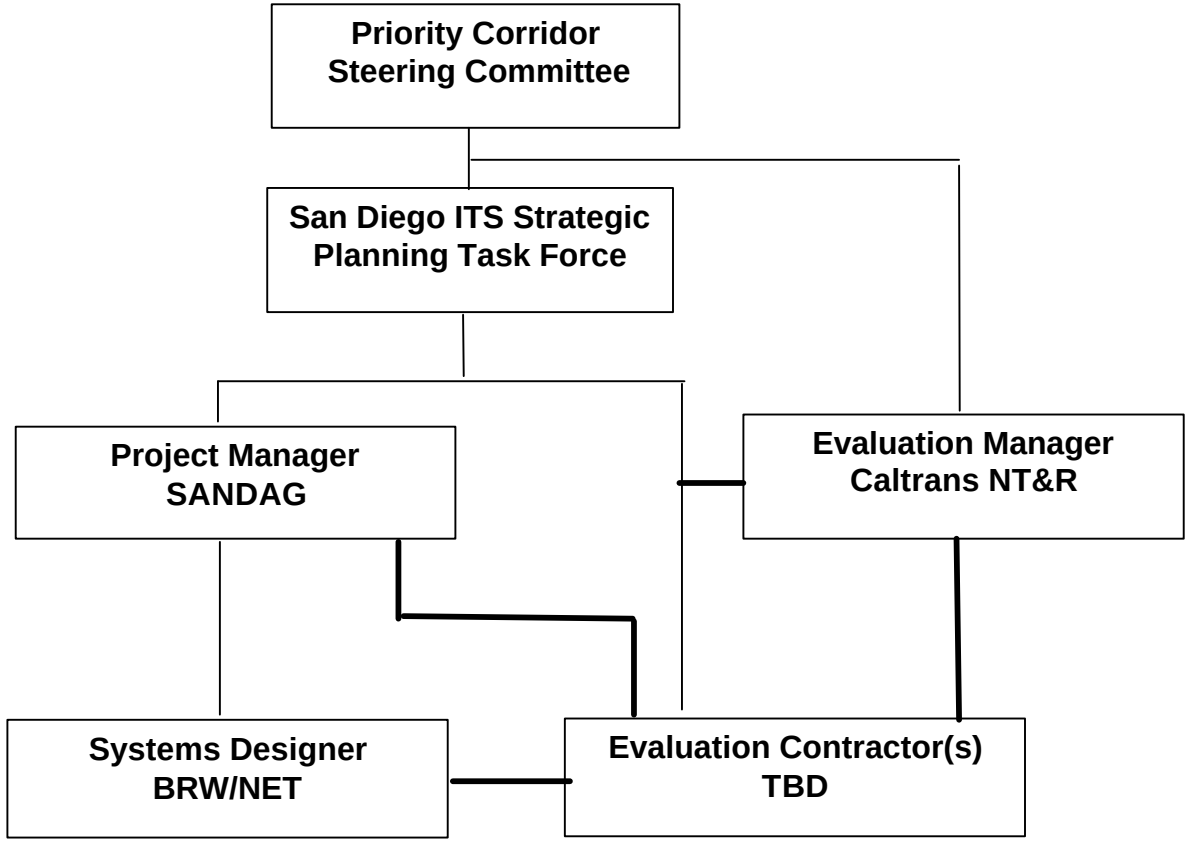
THE IMTMC PROJECT USES A RANGE OF SYSTEMS AND MARKET PACKAGES

SYSTEMS	MARKET PACKAGES
• Caltrans District 11 ATMS (existing) • Others TBD	• Network Surveillance • Regional Traffic Control • Incident Management System • Multi-modal Coordination • Emergency Response • Emergency Routing • HAZMAT Management

THE IMTMC PROJECT WILL OPERATE AT SHOWCASE LEVELTBD FOR CENTER TO CENTER INTEGRATION OF ADVANCED TRANSPORTATION MANAGEMENT SYSTEMS (ATMS)

- The SHOWCASE Program identified six possible levels of Center to Center integration for ATMS:
  - Level 1: Operate independently.
  - Level 2: Share data/video and single function operation.
  - Level 3: Share data/video and imbed cross-jurisdictional responses for major/special events.
  - Level 4: As Level 3 but on a day to day basis
  - Level 5: As Level 4 with added redundancies for major disasters.
  - Level 6: Centralize some or all management functions.
- IMTMC will operate at Level TBD.

THE PROJECT TEA IS LED BY THE SAN DIEGO ASSOCIATION OF GOVERNMENTS (SANDAG) – OTHER OFGANIZATIONAL LINKAGES ARE PROVISIONAL



THE IMTMC PROJECT HAS FIVE PARTICIPATING AGENCIES

- SANDAG (Sponsor)
- Caltrans District 11
- California Highway Patrol
- City of San Diego
- Metropolitan Transit Development Board

THE IMTMC WORKPLAN IS COMPRISED OF SEVEN MAJOR TASKS

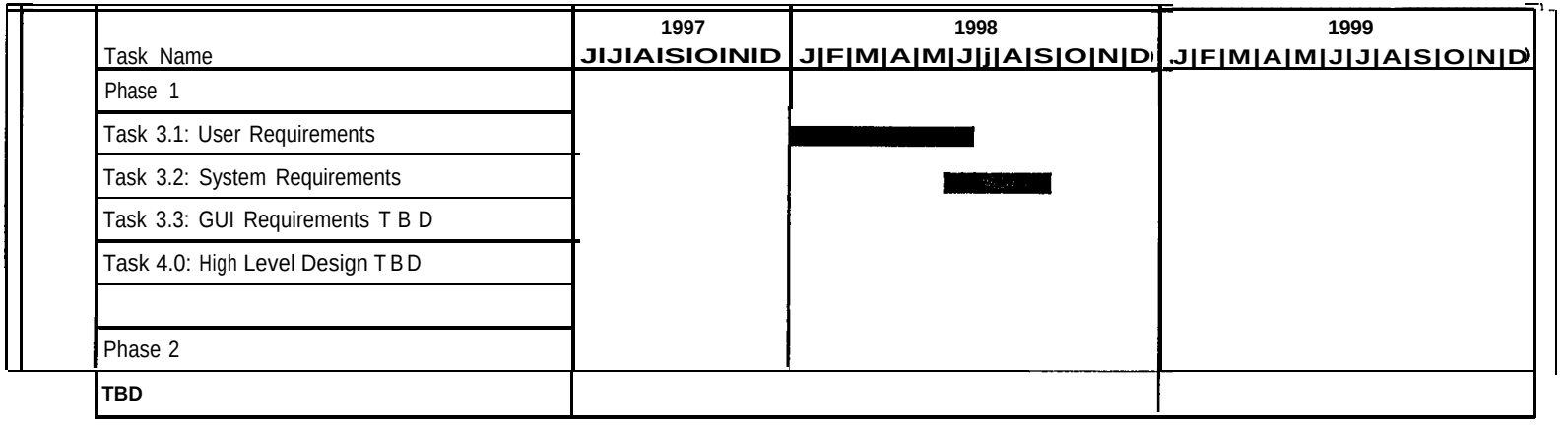
Phase 1

- Task 0.0-Project Management
- Task 1.0-Does not exist
- Task 2.0-Does not exist
- Task 3.0-IMTMC Requirements
- Task 4.0-IMTMC High Level Design

Phase 2

- Task 5.0-IMTMC Detailed Design
- Task 6.0-IMTMC Prototype Implementation
- Task 7.0-IMTMC Prototype Operations and Evaluation
- Task 8.0-IMTMC Final Design Implementation

A DETAILED PROJECT SCHEDULE IS NOT AVAILABLE - THE FOLLOWING IS BASED ON CURRENT UNDERSTANDING OF APPROXIMATE TIMINGS FOR SELECTED PHASE 1 TASKS



THE EVALUATION APPROACH FOR IMTMC IS BASED ON FIVE EVALUATION GOALS DEVELOPED FOR THE SHOWCASE PROGRAM

* Evaluation Goal #1: Assess the performance of the Showcase Program systems
* Evaluation Goal #2: Estimate the costs of the Showcase Program
* Evaluation Goal #3: Assess the institutional impacts of the Showcase Program
* Evaluation Goal #4: Assess the impact of the Showcase Program on management of transportation and traveler information
* Evaluation Goal #5: Evaluate selected transportation system impacts of the Showcase Program projects, including improvements arising from Showcase Program integration

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE

EVALUATION OBJECTIVES	MEASURES
1.1 Document the Showcase Program system development process, including configuration management	1.1.1 Document
1.2 Assess overall system reliability, availability, interoperability, compatibility, ease of use, and scaleability	1.2.1 System Mean-Time-Between-Failures (Failure Defined) 1.2.2 System Availability Equation ("Up Time" and "Down Time" defined) 1.2.3 Degree of System Interoperability as Provided by agency personnel 1.2.4 Assess level of compatibility in physical and operational environment by transportation agency technical staff 1.2.5 Estimate of system ease of use by transportation agency technical staff 1.2.6 Estimate of Scaleability by transportation agency technical staff
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3.2 Identify the impact of the Showcase Program on staffing/skill levels and training	3.2.1 Number of O&M staff changes required and/or requested 3.2.2 Estimated and/or actual system training time and costs 3.2.3 Number of additional job classifications created 3.2.4 Change in employee turnover rate

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
3.3 Document the impacts of emerging standards and a single high level designer concept on the competitive environment	3.3.1 Number of qualified and responsive proposals to system development RFPs 3.3.2 Magnitude of schedule and cost variation in system development 3.3.3 Document number of standards implemented 3.3.4 Number of different firms selected
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3.5 Assess the impact of the Showcase Program on local planning processes, policy development, and mainstreaming of ITS projects	3.5.1 Assess the impacts of the Showcase Program deployment plans on the local planning process, as perceived by SCAG and SANDAG planners
4.1 Assess the extent of regional and inter-regional transportation and traveler information integration between agencies	4.1.1 Increased information exchanges 4.1.2 Communications improvements, based on information integration, as perceived by agency personnel 4.1.3 Number of new ITS systems architecture data flows implemented
4.2 Assess the utilization of regional and inter-regional transportation and traveler information by agencies	4.2.1 Enhancement of transportation agency performance due to utilization of regional and inter-regional transportation and traveler information, as perceived by agency personnel
4.3 Assess the extent to which comprehensive and seamless traveler information was disseminated to, and used by travelers, including the relative effectiveness of different dissemination technologies	4.3.1 Indications of seamless access and favorable response by users 4.3.2 Indications of ease of access by travelers

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
5.1 Assess mode shift and intermodal impacts	5.1.1 Increase in ridership of public transit in target areas 5.1.2 Increase in traveler tendency to consider mode shift during target time periods
5.2 Assess the safety related impacts of the Showcase projects	5.2.1 Decrease in frequency and severity of accidents in target areas during target time periods 5.2.2 Increase in perceived safety benefits by travelers
5.3 Assess the impacts of the Showcase Projects on traffic congestion	5.3.1 Decreases in delay in target areas during target time periods 5.3.2 Increases in average speed in target areas during target time periods 5.3.3 Decreases in number of stops
5.4 Assess the environmental impacts of the Showcase Program	TBD · please refer to the Cross-cutting Analysis Strategy document
5.5 Assess the impact of the Showcase Program on transit operations	5.5.1 Increases in ridership and length of trip attributable to Showcase projects 5.5.2 Increases in operational efficiency in targeted areas 5.53 Reduction in selected operations costs 5.5.4 Number of staffing changes required
5.6 Not applicable to IMTMC	5.6.1 Not applicable to IMTMC 5.6.2 Not applicable to IMTMC

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS

* System Development and Performance
  - Document significant project technical development events, decisions, and trends
  - Examine system component (hardware and software) technical performance characteristics
  - Assess project development as part of the overall Showcase Program system integration
* Cost Assessment
  - Document and estimate project cost, based on publicly available data
  - Estimate project cost without the benefit of prior designs
  - Estimate project O&M costs, based on a minimum of 6 months of operations cost data

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Institutional Impacts
  - Document the impacts and consequences of O&M policy and procedural changes to participating transportation agencies
  - Document the requirements for changes in staffing and skills training, and the consequences
  - Document the impacts of emerging standards and a single high-level design concept on the competitive environment
  - Document and assess the impacts on motor carrier management of operations and administration
* Management of Transportation and Traveler Information
  - Investigate and assess the. level and relative magnitude of inter-regional information that results from the project (output and input)
  - Determine the level and relative magnitude of utilization of regional information by the project and from the project

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Transportation System Impacts
  - Identify and assess traffic congestion impacts at targeted areas and during targeted times
  - Identify and assess the degree of travel mode shifts or other changes in intermodal travel behavior
  - Determine, if possible, any marginal air quality benefits directly measurable from the project
  - Identify and assess transit operations and ridership changes for targeted areas and times
  - Identify and assess any safety benefits directly or indirectly attributable to the system

DATA COLLECTION SOURCES HAVE BEEN IDENTIFIED

* Existing sources
  - Caltrans District 11, volume and occupancy data, collected every 30 seconds, at half mile intervals, and used to calculate average speed
  - Other agencies - TBD
* New sources
  - TBD

ACTIVITIES EXTERNAL TO THE PROJECT WHICH MAY INFLUENCE DATA COLLECTION HAVE BEEN IDENTIFIED

* Construction
  - TBD
* Other
  - TBD

AGENCY DATA ARCHIVAL POLICIES

* Caltrans District 11 data archived for 12 months (by Caltrans)
* Other agencies - TBD

DRAFT

U.S. Department of Transportation
Federal Highway Administration

InterCAD Project

Evaluation Approach

Southern California ITS Priority Corridor Showcase Program

March 20,1998

*Prepared by; Booz*Allen & Hamilton*

DISCLAIMER

The purpose of this document is to provide a high level overview of the project and its evaluation. This document will be updated on a regular basis, as new information becomes available. All information provided in this document is believed accurate and current, but is not guaranteed.

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- Project Overview
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  - project description
  - relationship to other projects and the Showcase Program
  - systems and market packages
- Organizational Structure
- Project Workplan
- Schedule and Status
- Evaluation Overview
  - evaluation goals
  - evaluation objectives and initial measures
  - evaluation activities
  - data collection

THE INTERCAD PROJECT IS THE INITIAL SHOWCASE PROJECT IN THE SAN DIEGO REGION

- The goal of the InterCAD project is to improve incident management by integrating law enforcement and .emergency response agencies' computer aided dispatch (CAD) systems with freeway management systems.
- Law enforcement and emergency response agencies in San Diego each have their own CAD system, providing dispatch center personnel with information about officer availability for calls and, to some extent, officer location. In the past different agencies have shared information by telephone.
- The InterCAD project will incrementally link agency CAD systems with each other in a secure sub-network which restricts access to information, some of which may be highly sensitive. Caltrans District II, in common with other Caltrans Districts, currently accesses 'filtered' information (i.e., the media version via the Internet) from the California Highway Patrol (CHP) CAD system, for the purposes of freeway incident management.
- The InterCAD project will expand this secure sub-network and integrate it with the Showcase network, to provide wider access to selected law enforcement agency information which may facilitate freeway management.

THE INTERCAD PROJECT WILL PROVIDE LESSONS FOR FUTURE SHOWCASE PROJECTS WHICH HAVE DATA SECURITY ISSUES

- Phase 1 of this project (not funded by the Showcase Program) has integrated the CAD systems of the CHP, the San Diego Sheriff, and the San Diego Police Department. Phase 1was completed in May 1997, and comprises two message types.
- Phase 2 (funded by the Showcase Program) is underway, and will expand this phase 1sub-network, to include ten message types and seven new agencies:
  - San Diego Fire Department
  - North County Fire Joint Powers Agency
  - Heartland Communications Agency
  - California Division of Forestry & Fire Protection and Cleveland National Forest (co-located)
  - Oceanside Police Department & Fire Department
  - Federal Fire Department
- Phase 2 will also integrate the phase 1sub-network to the Showcase network via the San Diego Kernel, located at the Caltrans District 11TMC. This will be tested when the Showcase Kernel Prototype is temporarily installed in March 1998.

THE INTERCAD PROJECT USES AN IBM MESSAGE QUEUE MANAGER (MQM) MESSAGING SYSTEM TO 'PUSH' MESSAGES FROM ONE AGENCY TO OTHER AGENCIES

- Phase 1 comprised two message types:
  - To A Remote Agency
  - Activate Advised Incident
- Phase 2 comprises the Phase 1message types, and eight additional message types:
  - Delete Advised Incident
  - Activate Incident
  - Remote Unit
  - Remote Incident Information
  - Modify Incident
  - Delete Incident
  - Incident Cross Reference
  - (Reply) Positive Acknowledgement Transaction

THE INTERCAD PROJECT MAY BE EXTENDED TO INCLUDE FEDERAL AGENCIES INVOLVED IN BORDER CROSSING OPERATIONS

- Another Showcase project (also known as phase 2A of this InterCAD project), InterCAD Expansion, will add additional agencies, and may link to Federal enforcement agencies associated with international border operations:
  - FBI
  - Customs
  - Border Patrol
  - US Coast Guard
  - additional local agencies
- Of particular interest, the InterCAD Expansion project is under consideration to act as the coordination circuit for activating the Border Tactical voice communication system during incidents. This system enables voice communication between radios which operate on different radio frequencies. This currently takes 15 minutes to set up, and involves agencies communicating by telephone in advance. InterCAD will replace this preliminary telephone call, acting as the 'order-wire' for setting up the interface, with agencies effectively using InterCAD as a private, secure email network.

THE INTERCAD PROJECT IS RELATED TO OTHER SHOWCASE PROGRAM CORRIDOR-WIDE AND REGIONAL PROJECTS

- SHOWCASE Program (funded projects)
  - Intermodal Transportation Management Center (San Diego)*
  - Regional Traffic Signal Corrdination (San Diego)*
  - Mission Valley Monitoring and Information System (San Diego)*
  - Transit Management System (San Diego)*
- SHOWCASE Program (unfunded projects)
  - InterCAD Expansion (San Diego)
  - InterCAD (Inland Empire)
  - Regional Advanced Traveler Information System (San Diego)

Note: Projects indicated with a (*) are included in the Showcase Program Evaluation Strategy

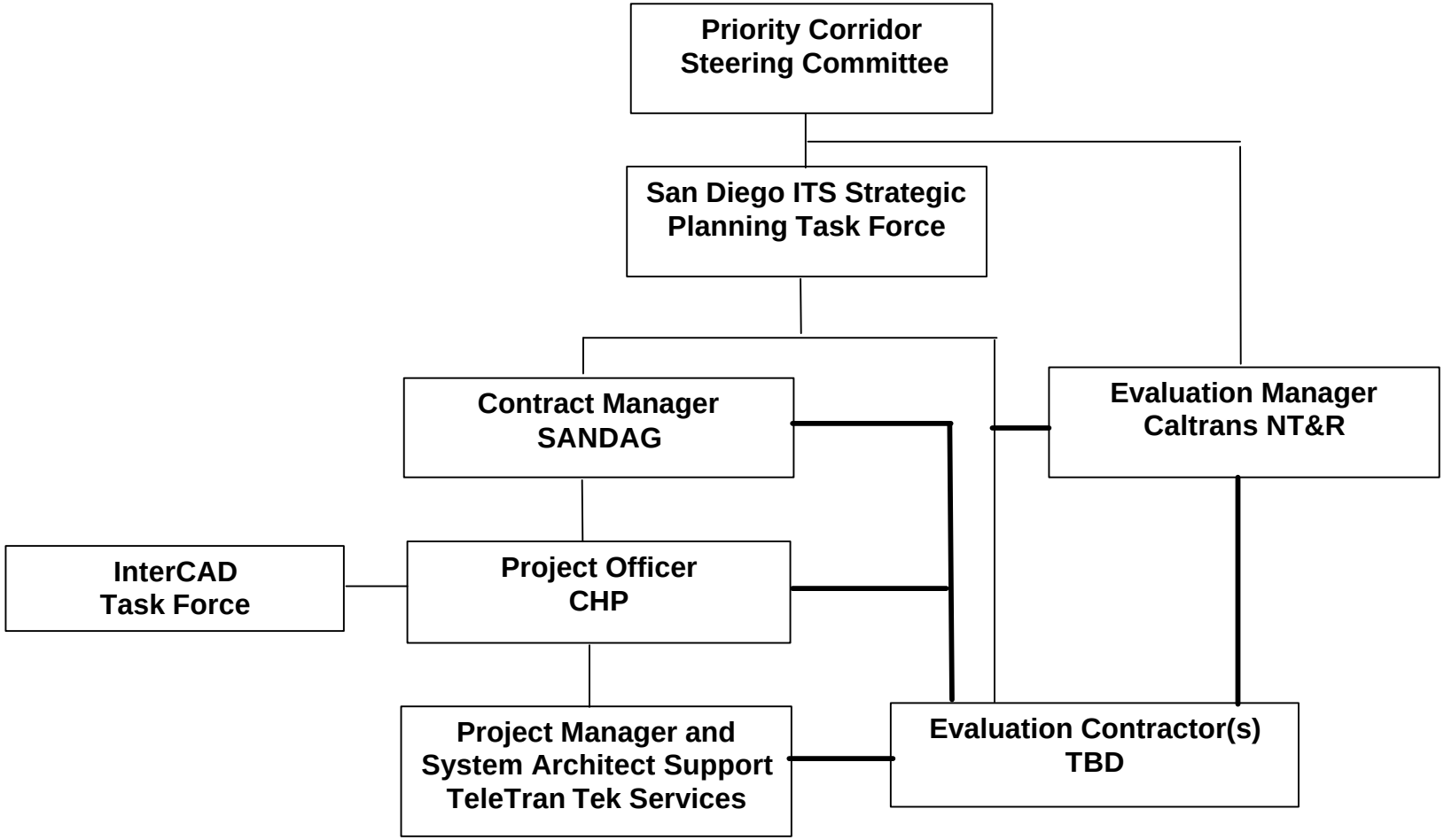
THE INTERCAD PROJECT USES A RANGE OF SYSTEMS AND MARKET PACKAGES

SYSTEMS	MARKET PACKAGES
• Caltrans District 11 ATMS (existing) • Computer Aided Dispatch • Wide Area Network • Others TBD	• Incident Management System • Transit Security • Emergency Response • Emergency Routing • Mayday Support • HAZMAT Management

THE INTERCAD PROJECT WILL OPERATE AT SHOWCASE LEVEL FOUR FOR CENTER TO CENTER INTEGRATION OF ADVANCED TRANSPORTATION MANAGEMENT SYSTEMS (ATMS)

- The SHOWCASE Program identified six possible levels of Center to Center integration for ATMS:
  - Level 1: Operate independently.
  - Level 2: Share data/video and single function operation.
  - Level 3: Share data/video and imbed cross-jurisdictional responses for major/special events.
  - Level 4: As Level 3 but on a day to day basis.
  - Level 5: As Level 4 with added redundancies for major disasters.
  - Level 6: Centralize some or all management functions.
- INTERCAD will operate at Level 4.

THE PROJECT TEAM IS LED BY THE SAN DIEGO ASSOCIATION OF GOVERNMENTS (SANDAG) – OTHER ORGANIZATIONAL LINKAGES ARE PROVISIONAL



THE INTERCAD PROJECT HAS TWELVE PARTICIPATING AGENCIES

- San Diego Association of Governments (SANDAG)
- Caltrans District 1 1
- California Highway Patrol
- San Diego Sheriff
- San Diego Police Department
- San Diego Fire Department
- North County Fire Joint Powers Agency
- Heartland Communications Agency
- California Division of Forestry & Fire Protection
- Cleveland National Forest
- Oceanside Police Department & Fire Department
- Federal Fire Department

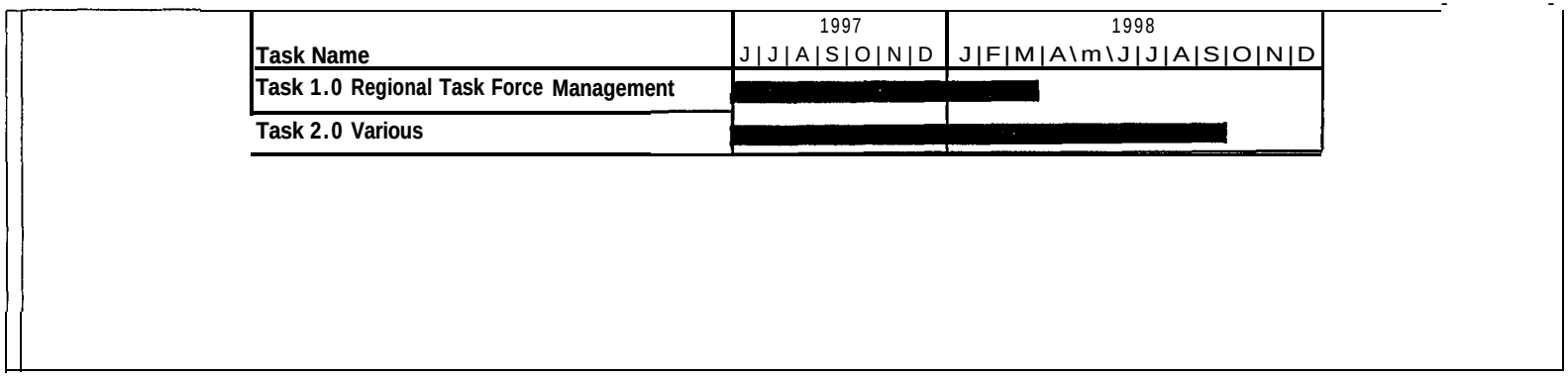
THE INTERCAD (PHASE 2) WORKPLAN IS COMPRISED OF 2 MAJOR TASKS

- Task 1.0-Regional Task Force Management
- Task 2.0-Expansion Support, Showcase Support, Operational Requirements, Functional Requirements, Hardware/Software Design, Interfaces, Integration and Testing, Installation, Demonstration, Message Standardization Guidelines, Reporting, Training, Quality Assurance, Evaluation Support, and Outreach Liaison

Note: Task 2.19-Evaluation Support, will ensure that a data collection methodology is identified and supported within the InterCAD architecture. As a minimum, the data collection methodology will support the ability to measure comparative notification and response times for mutual aid requests prior to, and after, implementation of the InterCAD capability in each participating agency.

The Showcase evaluation is intended to address the impact of connecting InterCAD to the Showcase network, rather than the impact of connecting the participating agencies. Task 2.19 above is intended to be undertaken by TeleTran Trek Services, but may support the Showcase evaluation.

CURRENT PROJECT SCHEDULE:



THE EVALUATION APPROACH FOR INTERCAD IS BASED ON FIVE EVALUATION GOALS DEVELOPED FOR THE SHOWCASE PROGRAM

* Evaluation Goal #1: Assess the performance of the Showcase Program systems
* Evaluation Goal #2: Estimate the costs of the Showcase Program
* Evaluation Goal #3: Assess the institutional impacts of the Showcase Program
* Evaluation Goal #4: Assess the impact of the Showcase Program on management of transportation and traveler information
* Evaluation Goal #5: Evaluate selected transportation system impacts of the Showcase Program projects, including improvements arising from Showcase Program integration

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE

EVALUATION OBJECTIVES	MEASURES
1.1 Document the Showcase Program system development process, including configuration management	**1.1.1 Document**
1.2 Assess overall system reliability, availability, **interoperability, compatibility, ease of use, and scaleability**	1.2.1 System Mean-Time-Between-Failures (Failure Defined) 1.2.2 System Availability Equation ("Up Time" and "Down Time" defined) **1.2.3 Degree of System Interoperability as Provided by agency personnel** **1.2.4 Assess level of compatibility in physical** and operational environment by transportation agency technical staff 1.2.5 Estimate of system ease of use by transportation agency technical staff **1.2.6 Estimate of Scaleability by transportation agency technical staff**
1.3 Assess how Showcase Program integration affected deployment of individual Showcase Program projects and their system performance	**1.3.1 Document**
2.1 Estimate the costs associated with the Showcase Program's "Design Once/ Deploy Often" Philosophy	**2.1.1 Actual costs of systems versus estimated costs based on "initial Design Principle" and comparable projects elsewhere**
2.2 Estimate Showcase Program operations & Maintenance (O&M) costs	**2.2.1 O&M costs annually, based on actual** costs six **months after system operation start-up**
3.1 Identify the impact of the Showcase Program on the O&M procedures and policies of the participating transportation aaencies	**3.1.1 Document**
3.2 Identify the impact of the Showcase Program on staffing/skill levels and training	**3.2.1 Number of O&M staff changes required and/or requested** **3.2.2 Estimated and/or actual system training time and costs** **3.2.3 Number of additional job classifications created** **3.2.4 Change in employee turnover rate**

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
3.3 Document the impacts of emerging standards and a single high level designer concept on the competitive environment	3.3.1 Number of qualified and responsive proposals to system development RFPs 3.3.2 Magnitude of schedule and cost variation in system development 3.3.3 Document number of standards implemented 3.3.4 Number of different firms selected
3.4 Not applicable to InterCAD	3.4.1 Not applicable to InterCAD 3.4.2 Not applicable to InterCAD
3.5 Assess the impact of the Showcase Program on local planning processes, policy development, and mainstreaming of ITS projects	3.51 Assess the impacts of the Showcase Program deployment plans on the local planning process, as perceived by SCAG and SANDAG planners
4.1 Assess the extent of regional and inter-regional transportation and traveler information integration between agencies	4.1.1 Increased information exchanges 4.1.2 Communications improvements, based on information integration, as perceived by agency personnel 4.1.3 Number of new ITS systems architecture data flows implemented
4.2 Assess the utilization of regional and inter-regional transportation and traveler information by agencies	4.2.1 Enhancement of transportation agency performance due to utilization of regional and inter-regional transportation and traveler information, as perceived by aoencv personnel
4.3 Not applicable to InterCAD	4.3.1 Not applicable to InterCad 4.3.2 Not applicable to InterCAD

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
5.1 Not applicable to InterCAD	5.1.1 Not applicable to InterCAD 5.1.2 Not applicable to InterCAD
5.2 Assess the safety related impacts of the Showcase projects	5.2.1 Decrease in frequency and severity of accidents in target areas during target time periods 5.2.2 Increase in perceived safety benefits by travelers
5.3 Assess the impacts of the Showcase Projects on traffic congestion	5.3.1 Decreases in delay in target areas during target time periods 5.3.2 Increases in average speed in target areas during target time periods 5.3.3 Decreases in number of stops
5.4 Assess the environmental impacts of the Showcase Program	TBD - please refer to the Cross-cutting Analysis Strategy document
5.5 Not applicable to InterCAD	5.5.1 Not applicable to InterCAD 5.5.2 Not applicable to InterCAD 5.5.3 Not applicable to InterCAD 5.5.4 Not applicable to InterCAD
5.6 Not applicable to InterCAD	5.6.1 Not applicable to InterCAD 5.6.2 Not applicable to InterCAD

Note: See note on page 13

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS

* System Development and Performance
  - Document significant project technical development events, decisions, and trends
  - Examine system component (hardware and software) technical performance characteristics
  - Assess project development as part of the overall Showcase Program system integration
* Cost Assessment
  - Document and estimate project cost, based on publicly available data
  - Estimate project cost without the benefit of prior designs
  - Estimate project O&M costs, based on a minimum of 6 months of operations cost data

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Institutional Impacts
  - Document the impacts and consequences of O&M policy and procedural changes to participating transportation agencies
  - Document the requirements for changes in staffing and skills training, and the consequences
  - Document the impacts of emerging standards and a single high-level design concept on the competitive environment
  - Document and assess the impacts on motor carrier management of operations and administration
* Management of Transportation and Traveler Information
  - Investigate and assess the level and relative magnitude of inter-regional information that results from the project (output and input)
  - Determine the level and relative magnitude of utilization of regional information by the project and from the project

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

- Transportation System Impacts
  - Identify and assess traffic congestion impacts at targeted areas and during targeted times
  - Identify and assess the degree of travel mode shifts or other changes in intermodal travel behavior
  - Determine, if possible, any marginal air quality benefits directly measurable from the project
  - Identify and assess transit operations and ridership changes for targeted areas and times
  - Identify and assess any safety benefits directly or indirectly attributable to the system

DATA COLLECTION SOURCES HAVE BEEN IDENTIFIED

* Existing sources
  - Caltrans District 11, volume and occupancy data, collected every 30 seconds, at half mile intervals, and used to calculate average speed
  - CHP-TBD
  - Other law enforcement and emergency response agencies - TBD
* New sources
  - TBD

DRAFT

U.S. Department of Transportation
Federal Highway Administration

Mission Valley Monitoring and Information System Project

Evaluation Approach

Southern California ITS Priority Corridor Showcase Program

March 20,1998

*Prepared by: Booz*Allen & Hamilton*

DISCLAIMER

The purpose of this document is to provide a high level overview of the project and its evaluation. This document will be updated on a regular basis, as new information becomes available. All information provided in this document is believed accurate and current, but is not guaranteed.

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  - evaluation objectives and initial measures
  - evaluation activities
  - data collection

THE MISSION VALLEY MONITORING AND INFORMATION SYSTEM (MIS) PROJECT IS ONE OF FOUR EARLY START SHOWCASE PROJECTS IN THE SAN DIEGO REGION

- The goal of the Mission Valley MIS project is to achieve operational improvements in traffic flow, by integrating existing ITS deployments surrounding the Mission Valley Qualcomm Stadium into the Showcase network and by closer interaction between agencies.
- The Mission Valley Qualcomm Stadium is located close to the intersection of Interstate Routes 8 and 15, five miles northeast of downtown San Diego. The stadium has access to two surface streets, Friars Road and San Diego Mission Road.
- The stadium currently seats more than 60,000 spectators, and has a parking capacity of nearly 20,000 cars and 150 buses.

THE MISSION VALLEY MIS PROJECT WILL DEMONSTRATE COORDINATED HIGHWAY AND TRANSIT OPERATIONS DURING EVENTS

- Currently, traffic control during events is by police officers located at intersections surrounding the stadium, and by the stadium's own traffic control center, which assumes control of two changeable message signs during events.
- Phase 1of this project (not funded by the Showcase Program) deployed traffic monitoring stations, CCTV cameras, additional changeable message signs, and highway advisory radio. These field devices are connected to the City of San Diego's Traffic Management Center. Phase 1 was compled in time for the Superbowl in January 1998.
- Phase 2 (funded by the Showcase Program) will integrate the phase 1 infrastructure to the San Diego Kernel, located at the Caltrans District 11 TMC. This will enable wider dissemination of traffic information, and will provide the scope for traffic control to be shared between the stadium traffic control center, the City of San Diego, and Caltrans District 11, utilizing Caltrans' field devices.

THE MISSION VALLEY MIS PROJECT IS RELATED TO OTHER SHOWCASE PROGRAM CORRIDOR-WIDE AND REGIONAL PROJECTS

- SHOWCASE Program (funded projects)
  - Intermodal Transportation Management Center (San Diego)*
  - Regional Traffic Signal Coordination (San Diego)*
  - Regional Transit Management System (San Diego)*
- SHOWCASE Program (unfunded projects)
  - Regional Transit Management System Expansion (San Diego)
  - Regional Advanced Traveler Information System (San Diego)
- Other
  - TBD

Note: Projects indicated with a (*) are included in the Showcase Program Evaluation Strategy

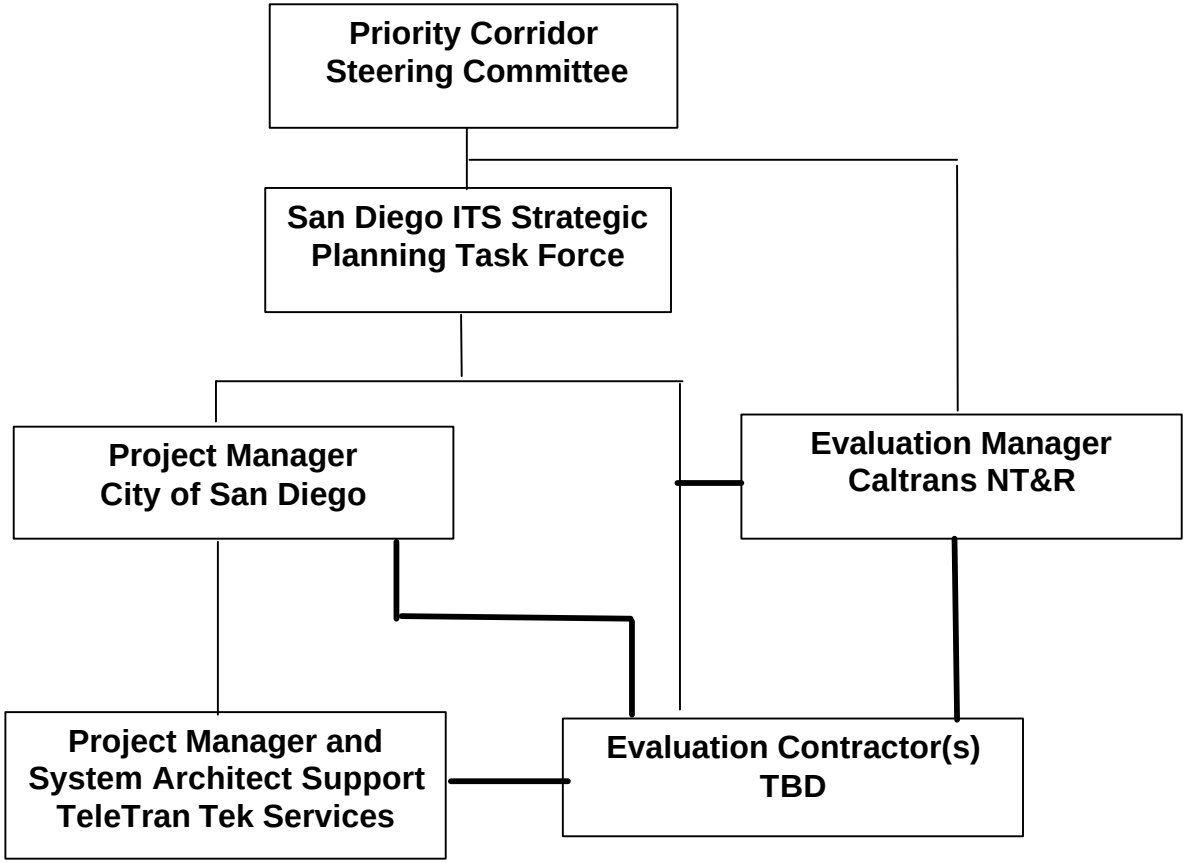
THE MISSION VALLEY MIS PROJECT USES A RANGE OF SYSTEMS AND MARKET PACKAGES

SYSTEMS	MARKET PACKAGES
• Caltrans District 11 ATMS (existing) • City of San Diego TMC (existing) • Others TBD	• Network Surveillance • Incident Management System • Transit Vehicle Tracking • Broadcast Traveler Information

THE MISSION VALLEY MIS PROJECT WILL OPERATE AT SHOWCASE LEVEL TBD FOR CENTER TO CENTER INTEGRATION OF ADVANCED TRANSPORTATION MANAGEMENT SYSTEMS (ATMS)

- The SHOWCASE Program identified six possible levels of Center to Center integration for ATMS:
  - Level 1: Operate independently.
  - Level 2: Share data/video and single function operation.
  - Level 3: Share data/video and imbed cross-jurisdictional responses for major/special events,.
  - Level 4: As Level 3 but on a day to day basis.
  - Level 5: As Level 4 with added redundancies for major disasters.
  - Level 6: Centralize some or all management functions.
- The Mission Valley MIS project will operate at Level TBD.

THE PROJECT TEAM IS LED BY THE CITY OF SAN DIEGO – OTHER ORGANIZATIONAL LINKAGES ARE PROVISIONAL



THE MISSION VALLEY MIS PROJECT HAS FIVE PARTICIPATING AGENCIES

,

- City of San Diego (Sponsor)
- Caltrans District 11
- SANDAG
- Mission Valley Qualconim Stadium Authority
- Metropolitan Transit Development Board

THE MISSION VALLEY MIS WORKPLAN IS COMPRISED OF FOUR MAJOR TASKS

- Task 1.0-TMC Concept of 'Operations
- Task 2.0-TMC System Design
- Task 3.0-System Implementation
- Task 4.0-Operating Plan and Procedures

THE MISSION VALLEY MIS PROJECT HAS NOT YET COMMENCED - THE PROJECT SCHEDULE ASSUMES A JUNE 1,1998 KICK-OFF - A DETAILED PROJECT SCHEDULE IS NOT AVAILABLE

Task Name	1997 J | J | A | S | O | N | D	1998 J|F|M|A|M|J|J|A|S|O|N|D	1999 J | F | M | A | M | J | J | A | S | O | N | D
Phase 1(complete)			
Phase II			
Task 1.0: TMC Concept of Operations			
Task 2.0: TMC System Design			
Task 3.0: System Implementation			
Task 4.0: Operating Plan and Procedures			

THE EVALUATION APPROACH FOR MISSION VALLEY MIS IS BASED ON FIVE EVALUATION GOALS DEVELOPED FOR THE SHOWCASE PROGRAM

* Evaluation Goal #1: Assess the performance of the Showcase Program systems
* Evaluation Goal #2: Estimate the costs of the Showcase Program
* Evaluation Goal #3: Assess the institutional impacts of the Showcase Program
* Evaluation Goal #4: Assess the impact of the Showcase Program on management of transportation and traveler information
* Evaluation Goal #5: Evaluate selected transportation system impacts of the Showcase Program projects, including improvements arising from Showcase Program integration

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE

EVALUATION OBJECTIVES	MEASURES
1.1 Document the Showcase Program system development process, including configuration management	1.1.1 Document
1.2 Assess overall system reliability, availability, interoperability, compatibility, ease of use, and scaleability	1.2.1 System Mean-Time-Between-Failures (Failure Defined) 1.2.2 System Availability Equation ("Up Time" and "Down Time" defined) 1.2.3 Degree of System Interoperability as Provided by agency personnel 1.2.4 Assess level of compatibility in physical and operational environment by transportation agency technical staff 1.2.5 Estimate of system ease of use by transportation agency technical staff 1.2.6 Estimate of Scaleability by transportation agency technical staff
1.3 Assess how Showcase Program integration affected deployment of individual Showcase Program projects and their system performance	1.3.1 Document
2.1 Estimate the costs associated with the Showcase Program's "Design Once/ Deploy Often" Philosophy	2.1.1 Actual costs of systems versus estimated costs based on "initial Design Principle" and comparable projects elsewhere
2.2 Estimate Showcase Program operations & Maintenance (O&M) costs	2.2.1 O&M costs annually, based on actual costs six months after system operation start-up
3.1 Identify the impact of the Showcase Program on the O&M procedures and policies of the participating transportation agencies	3.1.1 Document
3.2 Identify the impact of the Showcase Program on staffing/skill levels and training	3.2.1 Number of O&M staff changes required and/or requested 3.2.2 Estimated and/or actual system training time and costs 3.2.3 Number of additional job classifications created 3.2.4 Change in employee turnover rate

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
3.3 Document the impacts of emerging standards and a single high level designer concept on the competitive environment	3.3.1 Number of qualified and responsive proposals to system development RFPs 3.3.2 Magnitude of schedule and cost variation in system development 3.3.3 Document number of standards implemented 3.3.4 Number of different firms selected
3.4 Document participation by the private sector in the management of transportation and traveler information	3.4.1 Number of private companies involved in Showcase transportation and traveler information management 3.4.2 Number of private company personnel involved in Showcase transportation and traveler information management
3.5 Assess the impact of the Showcase Program on local planning processes, policy development, and mainstreaming of ITS oroiects	3.5.1 Assess the impacts of the Showcase Program deployment plans on the local planning process, as perceived by SCAG and SANDAG planners
4.1 Assess the extent of regional and inter-regional transportation and traveler information integration between agencies	4.1 .1 Increased information exchanges 4.1.2 Communications improvements, based on information integration, as perceived by agency personnel 4.1.3 Number of new ITS systems architecture data flows implemented
4.2 Assess the utilization of regional and inter-regional transportation and traveler information by agencies	4.2.1 Enhancement of transportation agency performance due to utilization of regional and inter-regional transportation and traveler information, as perceived by agency personnel
4.3 Assess the extent to which comprehensive and seamless traveler information was disseminated to, and used by travelers, including the relative effectiveness of different dissemination technologies	4.3.1 Indications of seamless access and favorable response by users 4.3.2 Indications of ease of access by travelers

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
5.1 Assess mode shift and intermodal impacts	5.1 .1 Increase in ridership of public transit in target areas 5.1.2 Increase in traveler tendency to consider mode shift during target time periods
5.2 Assess the safety related impacts of the Showcase projects	5.2.1 Decrease in frequency and severity of accidents in target areas during target time periods 5.2.2 Increase in perceived safety benefits by travelers
5.3 Assess the impacts of the Showcase Projects on traffic congestion	5.3.1 Decreases in delay in target areas during target time periods 5.3.2 Increases in average speed in target areas during target time periods 5.3.3 Decreases in number of stops
5.4 Assess the environmental impacts of the Showcase Program	TBD - please refer to the Cross-cutting Analysis Strategy document
5.5 Assess the impact of the Showcase Program on transit operations	5.5.1 Increases in ridership and length of trip attributable to Showcase projects 5.5.2 Increases in operational efficiency in targeted areas 5.53 Reduction in selected operations costs 5.54 Number of staffing changes required
5.6 Not applicable to Mission Valley MIS	5.6.1 Not applicable to Mission Valley MIS 5.6.2 Not applicable to Mission Valley MIS

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS

* System Development and Performance
  - Document significant project technical development events, decisions, and trends
  - Examine system component (hardware and software) technical performance characteristics
  - Assess project development as part of the overall Showcase Program system integration
* Cost Assessment
  - Document and estimate project cost, based on publicly available data
  - Estimate project cost without the benefit of prior designs
  - Estimate project O&M costs, based on a minimum of 6 months of operations cost data

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Institutional Impacts
  - Document the impacts and consequences of O&M policy and procedural changes to participating transportation agencies
  - Document the requirements for changes in staffing and skills training, and the consequences
  - Document the impacts of emerging standards and a single high-level design concept on the competitive environment
  - Document and assess the impacts on motor carrier management of operations and administration
* Management of Transportation and Traveler Information
  - Investigate and assess the level and relative magnitude of inter-regional information that results from the project (output and input)
  - Determine the level and relative magnitude of utilization of regional information by the project and from the project

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Transportation System Impacts
  - Identify and assess traffic congestion impacts at targeted areas and during targeted times
  - Identify and assess the degree of travel mode shifts or other changes in intermodal travel behavior
  - Determine, if possible, any marginal air quality benefits directly measurable from the project
  - Identify and assess transit operations and ridership changes for targeted areas and times
  - Identify and assess any safety benefits directly or indirectly attributable to the system

DATA COLLECTION SOURCES HAVE BEEN IDENTIFIED

* Existing sources
  - Caltrans District 11, volume and occupancy data, collected every 30 seconds, at half mile intervals, and used to calculate average speed
  - Other agencies - TBD
* New sources
  - TBD

ACTIVITIES EXTERNAL TO THE PROJECT WHICH MAY INFLUENCE DATA COLLECTION HAVE BEEN IDENTIFIED

* Construction
  - TBD
* Other
  - TBD

AGENCY DATA ARCHIVAL POLICIES

- Caltrans District 11 data archived for 12 months (by Caltrans)
- Other agencies - TBD

DRAFT

U.S. Department of Transportation
Federal Highway Administration

Transit Management System Project

Evaluation Approach

Southern California ITS Priority Corridor Showcase Program

March 20,1998

Prepared by: Booz*Allen & Hamilton

DISCLAIMER

The purpose of this document is to provide a high level overview of the project and its evaluation. This document will be updated on a regular basis, as new information becomes available. All information provided in this document is believed accurate and current, but is not guaranteed.

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  - project description
  - relationship to other projects and the Showcase Program
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- Evaluation Overview
  - evaluation goals
  - evaluation objectives and initial measures
  - evaluation activities
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THE TRANSIT MANAGEMENT SYSTEM (TMS) PROJECT WILL BE ONE OF FOUR SHOWCASE EARLY START PROJECTS IN THE SAN DIEGO REGION

- The goal of the TMS project is to improve the effectiveness and efficiency of transit operations by integrating information management systems, transit vehicle systems, and traffic systems. The TMS may also include security systems and maintenance.
- Integrated transit management centers will be developed for each transit provider, and will provide real time information to assist in improving transit operations. Real time transit information will also be transmitted to the regional Intermodal Transportation Management Center, operated by Caltrans District 11
- Ultimately, intelligent systems will be deployed on buses, trolley trains, Coaster locomotives, and at intersections.
- The TMS project will support the San Diego region's freeway service patrol (FSP), through integration of Automatic Vehicle Location/Global Positioning System (AVL/GPS), deployment.

THE TMS PROJECT WILL DEMONSTRATE ADVANCED TRANSIT OPERATIONS ACROSS A RANGE OF MODES, INTEGRATED WITH FSP, THROUGHOUT THE SAN DIEGO REGION

- A workplan will be developed as part of Phase 1of the Intermodal Transportation Management Center project (another San Diego Regional Showcase project). Two phases are currently envisioned for this TMS project.
- Phase 1of this project will provide a 'proof of concept' in the San Diego area, that can be expanded throughout the San Diego region, and the Priority Corridor. Initial deployment will take place in the Kearney Mesa Division of the Metropolitan Transit Development Board (MTDB), the regional TMC (Caltrans District 1 I), and the North County Transit District (NCTD), involving:
  - 127 buses (MTDB)
  - 6 Coaster locomotives (NCTD)
  - 25 FSP vehicles (Caltrans)
  - 10 intersections in the City of San Diego
- Phase 2 (currently unfunded) will include all significant transit providers (up to seven new centers):
  - additional 370 buses
  - all trolley trains (approximately 100 vehicles)
  - approximately 125 intersections

THE TMS PROJECT IS RELATED TO OTHER SHOWCASE PROGRAM CORRIDOR-WIDE AND REGIONAL PROJECTS

- SHOWCASE Program (funded projects)
  - Intermodal Transportation Management Center (San Diego)*
  - Regional Traffic Signal Coordination (San Diego)*
  - InterCAD (San Diego)*
  - Mission Valley Monitoring and Information System (San Diego)*
  - IMAJINE (Los Angeles/Ventura)*
- SHOWCASE Program (unfunded projects)
  - Regional Transit Management System Expansion (San Diego)
  - Regional Advanced Traveler Information System (San Diego)
- Other
  - TBD

Note: Projects indicated with a (*) are included in the Showcase Program Evaluation Strategy

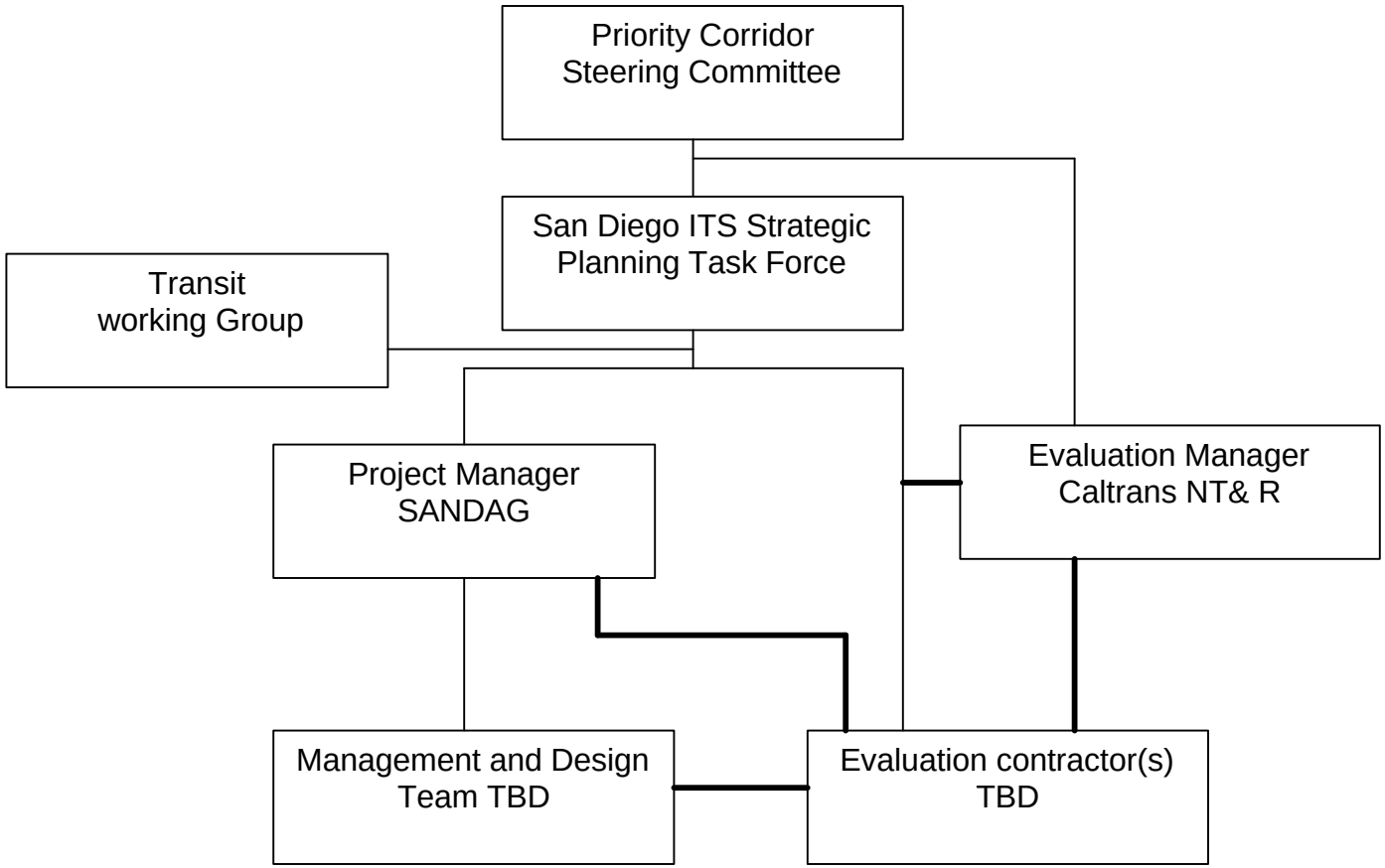
THE TMS PROJECT USES A RANGE OF SYSTEMS AND MARKET PACKAGES

SYSTEMS	MARKET PACKAGES
• Caltrans District 11 ATMS (existing) • Automatic Vehicle Location • Intelligent Traffic Intersections • Others TBD	• Transit Vehicle Tracking • Transit Fixed-Route Operations • Demand Response Transit Operations • Transit Passenger & Fare Management • Transit Security • Multi-modal Coordination • Broadcast Traveler Information • Interactive Traveler Information

THE TMS PROJECT WILL OPERATE AT SHOWCASE LEVEL TBD FOR CENTER TO CENTER INTEGRATION OF ADVANCED TRANSPORTATION MANAGEMENT SYSTEMS (ATMS)

- The SHOWCASE Program identified six possible levels of Center to Center integration for ATMS:
  - Level 1: Operate independently.
  - Level 2: Share data/video and single function operation.
  - Level 3: Share data/video and imbed cross-jurisdictional responses for major/special events.
  - Level 4: As Level 3 but on a day to day basis
  - Level 5: As Level 4 with added redundancies for major disasters.
  - Level 6: Centralize some or all management functions.
- The TMS project will operate at Level TBD.

THE PROJECT TEAM IS LED BY THE SAN DIEGO ASSOCIATION OF GOVERNMENTS (SANDAG) - OTHER ORGANIZATIONAL LINKAGES ARE PROVISIONAL



THE TMS PROJECT HAS TEN PARTICIPATING AGENCIES

- SANDAG (Sponsor)
- Caltrans District 11
- Metropolitan Transit Development Board
- North County Transit District
- San Diego Trolley
- San Diego Transit
- County Transit
- Chula Vista Transit
- National City Transit
- City of San Diego

THE PHASE 1 TMS WORKPLAN IS COMPRISED OF 12 MAJOR TASKS

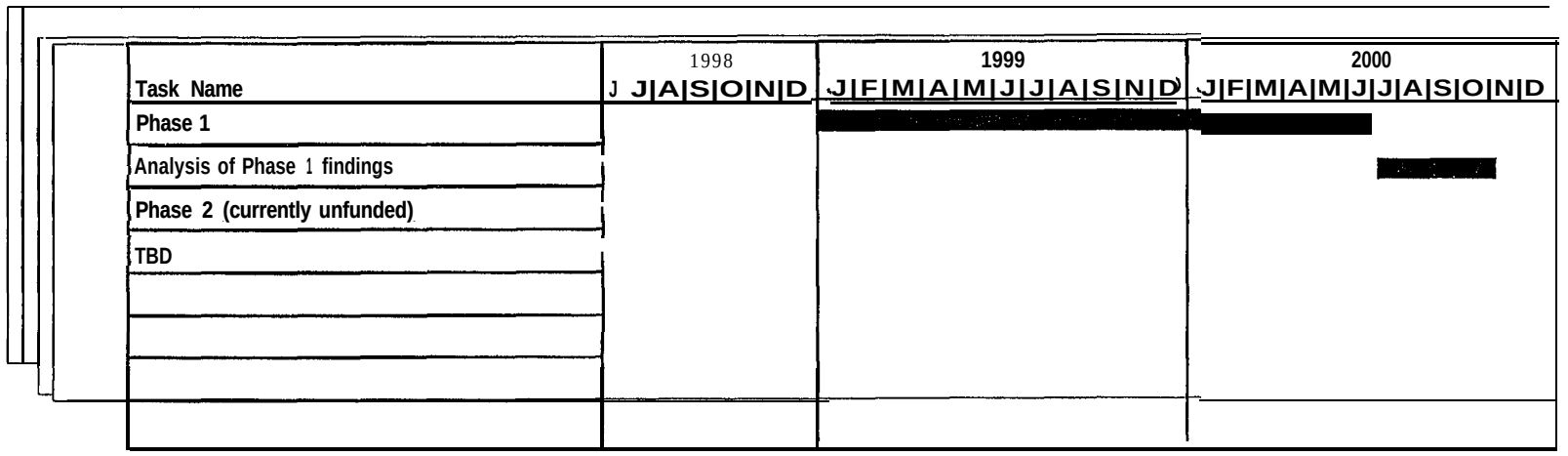
- Task 1.1-Develop MOUs and Procure Management and Design Team Consultant
- Task 1.2-Determine Operational Concepts and Requirements
- Task 1.3-Develop Detaiied Functional Requirements
- Task 1.4-Develop High Level Hardware and Software System Architecture
- Task 1.5-Conduct a Vendor Workshop
- Task 1.6-Deploy Intelligent Information Management Systems
- Task 1.7-Deploy Prototype Intelligent Vehicle System Components
- Task 1.8-Integrate Prototype Transit and FSP Information Objects with Kernel
- Task 1.9-Deploy Prototype Intelligent Traffic System Components
- Task 1.10-Provide Operations Demonstration of Vehicle Tracking
- Task 1.11-Fully Test and Evaluate the Prototype System
- Task 1.12-Prepare Phase 1 Report

THE PHASE 2 TMS WORKPLAN IS COMPRISED OF 10 MAJOR TASKS

- Task 2.1-Expand MOUs
- Task 2.2-Evaluate Locations, Routes, Modes, Parties for Further Deployment
- Task 2.3-Modify Tasks 1.2 & 1.3 for New Operational and Functional Requirements
- Task 2.4-Modify High Level System Architecture
- Task 2.5-Deploy Additional Intelligent Information Management Systems
- Task 2.6-Deploy Additional Communications Linkages as required by Tasks 2.4 & 2.5 / Deploy Additional Intelligent Vehicle System Components
- Task 2.7-Deploy Additional Intelligent Traffic System Components
- Task 2.8-Deploy Additional System Components as defined by Tasks 2.3 & 2.4
- Task 2.9-Evaluate System Performance
- Task 2.10-Prepare Phase 2 Report

Schedule and Status.. .

THE TMS PROJECT HAS NOT YET COMMENCED -THE PROJECT SCHEDULE ASSUMES A JANUARY 1, 1999 KICK-OFF- A DETAILED PROJECT SCHEDULE IS NOT AVAILABLE



Note: The project cannot commence until a workplan for Phase 1has been submitted to, and approved by, FHWA.

THE EVALUATION APPROACH FOR TMS IS BASED ON FIVE EVALUATION GOALS DEVELOPED FOR THE SHOWCASE PROGRAM

* Evaluation Goal #1 Assess the performance of the Showcase Program systems
* Evaluation Goal #2: Estimate the costs of the Showcase Program
* Evaluation Goal #3: Assess the institutional impacts of the Showcase Program
* Evaluation Goal #4: Assess the impact of the Showcase Program on management of transportation and traveler information
* Evaluation Goal #5: Evaluate selected transportation system impacts of the Showcase Program. projects, including improvements arising from Showcase Program integration

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE

EVALUATION OBJECTIVES	MEASURES
1.1 Document the Showcase Program system development process, including configuration management	1.1.1 Document
1.2 Assess overall system reliability, availability, interoperability, compatibility, ease of use, and scaleability	1.2.1 System Mean-Time-Between-Failures (Failure Defined) 1.2.2 System Availability Equation ("Up Time" and "Down Time" defined) 1.2.3 Degree of System Interoperability as Provided by agency personnel 1.2.4 Assess level of compatibility in physical and operational environment by transportation agency technical staff 1.2.5 Estimate of system ease of use by transportation agency technical staff 1.2.6 Estimate of Scaleability by transportation agency technical staff
1.3 Assess how Showcase Program integration affected deployment of individual Showcase Program projects and their system performance	1.3.1 Document
2.1 Estimate the costs associated with the Showcase Pronram's "Design Once/ Deploy Often" Philosophy	2.1,1 Actual costs of systems versus estimated costs based on "initial Design Principle" and comparable projects elsewhere
2.2 Estimate Showcase Program operations & Maintenance (O&M) costs	2.2.1 O&M costs annually, based on actual costs six months after system operation start-up
3.1 Identify the impact of the Showcase Program on the O&M procedures and policies of the participating transportation agencies	3.1.1 Document
3.2 Identify the impact of the Showcase Program on staffing/skill levels and training	3.2.1 Number of O&M staff changes required and/or requested 3.2.2 Estimated and/or actual system training time and costs 3.2.3 Number of additional job classifications created 3.2.4 Change in employee turnover rate

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
3.3 Document the impacts of emerging standards and a single high level designer concept on the competitive environment	3.3.1 Number of qualified and responsive proposals to system development RFPs 3.3.2 Magnitude of schedule and cost variation in system development 3.3.3 Document number of standards implemented 3.3.4 Number of different firms selected
3.4 Not applicable to TMS	3.4.1 Not applicable to TMS 3.4.2 Not applicable to TMS
3.5 Assess the impact of the Showcase Program on local planning processes, policy development, and mainstreaming of ITS projects	3.51 Assess the impacts of the Showcase Program deployment plans on the local planning process, as perceived by SCAG and SANDAG planners
4.1 Assess the extent of regional and inter-regional transportation and traveler information integration between agencies	4.1.1 Increased information exchanges 4.1.2 Communications improvements, based on information integration, as perceived by agency personnel 4.1.3 Number of new ITS systems architecture data flows implemented
4.2 Assess the utilization of regional and inter-regional transportation and traveler information by agencies	4.2.1 Enhancement of transportation agency performance due to utilization of regional and inter-regional transportation and traveler information, as perceived by aaencv personnel
4.3 Not applicable to TMS	4.3.1 Not applicable to TMS 4.3.2 Not applicable to TMS

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
5.1 Assess mode shift and intermodal impacts	5.1.1 Increase in ridership of public transit in target areas 5.1.2 Increase in traveler tendency to consider mode shift during target time periods
5.2 Not applicable to TMS	5.2.1 Not applicable to TMS 5.2.2 Not applicable to TMS
5.3 Assess the impacts of the Showcase Projects on traffic congestion	5.3.1 Decreases in delay in target areas during target time periods 5.3.2 Increases in average speed in target areas during target time periods 5.3.3 Decreases in number of stops
5.4 Assess the environmental impacts of the Showcase Program	TBD please refer to the Cross-cutting Analysis Strategy document
5.5 Assess the impact of the Showcase Program on transit operations	5.5.1 Increases in ridership and length of trip attributable to Showcase projects 5.5.2 Increases in operational efficiency in targeted areas 5.5.3 Reduction in selected operations costs 5.5.4 Number of staffing changes required
5.6 Not applicable to TMS	5.6.1 Not applicable to TMS 5.6.2 Not applicable to TMS

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS

* System Development and Performance
  - Document significant project technical development events, decisions, and trends
  - Examine system component (hardware and software) technical performance characteristics
  - Assess project development as part of the overall Showcase Program system integration
* Cost Assessment
  - Document and estimate project cost, based on publicly available data
  - Estimate project cost without the benefit of prior designs
  - Estimate project O&M costs, based on a minimum of 6 months of operations cost data

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

- Institutional Impacts
  - Document the impacts and consequences of O&M policy and procedural changes to participating transportation agencies
  - Document the requirements for changes in staffing and skills training, and the consequences
  - Document the impacts of emerging standards and a single high-level design concept on the competitive environment
  - Document and assess the impacts on motor carrier management of operations and administration
- Management of Transportation and Traveler Information
  - Investigate and assess the level and relative magnitude of inter-regional information that results from the project (output and input)
  - Determine the level and relative magnitude of utilization of regional information by the project and from the project

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Transportation System Impacts

- Identify and assess traffic congestion impacts at targeted areas and during targeted times ,
- Identify and assess the degree of travel mode shifts or other changes in intermodal travel behavior
- Determine, if possible, any marginal air quality benefits directly measurable from the project
- Identify and assess transit operations and ridership changes for targeted areas and times
- Identify and assess any safety benefits directly or indirectly attributable to the system

DATA COLLECTION SOURCES HAVE BEEN IDENTIFIED

* Existing sources
  - Caltrans District 11, volume and occupancy data, collected every 30 seconds, at half mile intervals, and used to calculate average speed
  - Other agencies - TBD
* New sources
  - TBD

ACTIVITIES EXTERNAL TO THE PROJECT WHICH MAY INFLUENCE DATA COLLECTION HAVE BEEN IDENTIFIED

* Construction
  - TBD
* Other
  - TBD

AGENCY DATA ARCHIVAL POLICIES

* Caltrans District 11 data archived for 12 months (by Caltrans)
* Other agencies - TBD

DRAFT

U.S. Department of Transportation
Federal Highway Administration

Traffic Signal Integration Project

Evaluation Approach

Southern California ITS Priority Corridor Showcase Program

March 25,1998

Prepared by: Booz*Allen & Hamilton

DISCLAIMER

The purpose of this document is to provide a high level overview of the project and its evaluation. This document will be updated on a regular basis, as new information becomes available. All information provided in this document is believed accurate and current, but is not guaranteed.

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THE TRAFFIC SIGNAL INTEGRATION (TSI) PROJECT WILL BE ONE OF FIVE FUNDED SHOWCASE PROJECTS IN THE SAN DIEGO REGION

- The goal of the TSI project is to improve traffic flow along major arterials regardless of jurisdictional changes, by optimizing and coordinating traffic signal operations.
- Within the San Diego Region, existing traffic control systems consist primarily of the City of San Diego, other-cities, and Caltrans District 11. A range of proprietary traffic signal operating systems are used throughout the region, although most controllers are type 170s.
- The TSI project offers the potential to be developed into a series of Smart Corridors, or a Smart Network, enabling coordinated management of regular traffic, incidents, and special events. This may require different modes of operation, where some agencies allow other agencies to coordinate their signals, while retaining the ability to oversee traffic operations.

THE TSI PROJECT WILL EXPLORE SEVERAL METHODS OF ACHIEVING COORDINATION OF TRAFFIC SIGNAL OPERATIONS IN SAN DIEGO COUNTY

- The regional architecture proposes the support of various traffic signal operating systems, communicating to a single point of integration. The TSI project will consider two 'models' as a basis for achieving this integration:
  - North San Diego Multiple Master model, for cities which have adopted BiTrans QuicNet as their traffic signal operating system, where each city will be responsible for interconnection of its own master control system with the Showcase Kernel.
  - East San Diego Single Master model, for cities which form a regional sub-group operating from a single master, interconnected with the Showcase Kernel.
- In addition, existing commuter rail lines cross at-grade through a number of traffic controlled intersections. Using predictive modeling of train arrival times, both models propose adaptive signal control to reduce the detrimental impact of rail preemption.

THE TSI PROJECT IS RELATED TO OTHER SHOWCASE PROGRAM CORRIDOR-WIDE AND REGIONAL PROJECTS

- SHOWCASE Program (funded projects)
  - Intermodal Transportation Management Center (San Diego)*
  - InterCAD (San Diego)*
  - Mission Valley Monitoring and Information System (San Diego)*
  - Regional Transit Management System (San Diego)*
- SHOWCASE Program (unfunded projects)
  - InterCAD Expansion (San Diego)
  - Regional Advanced Traveler Information System (San Diego)
  - Regional Transit Management System Expansion (San Diego)
- Other
  - TBD

Note: Projects indicated with a (*) are included in the Showcase Program Evaluation Strategy

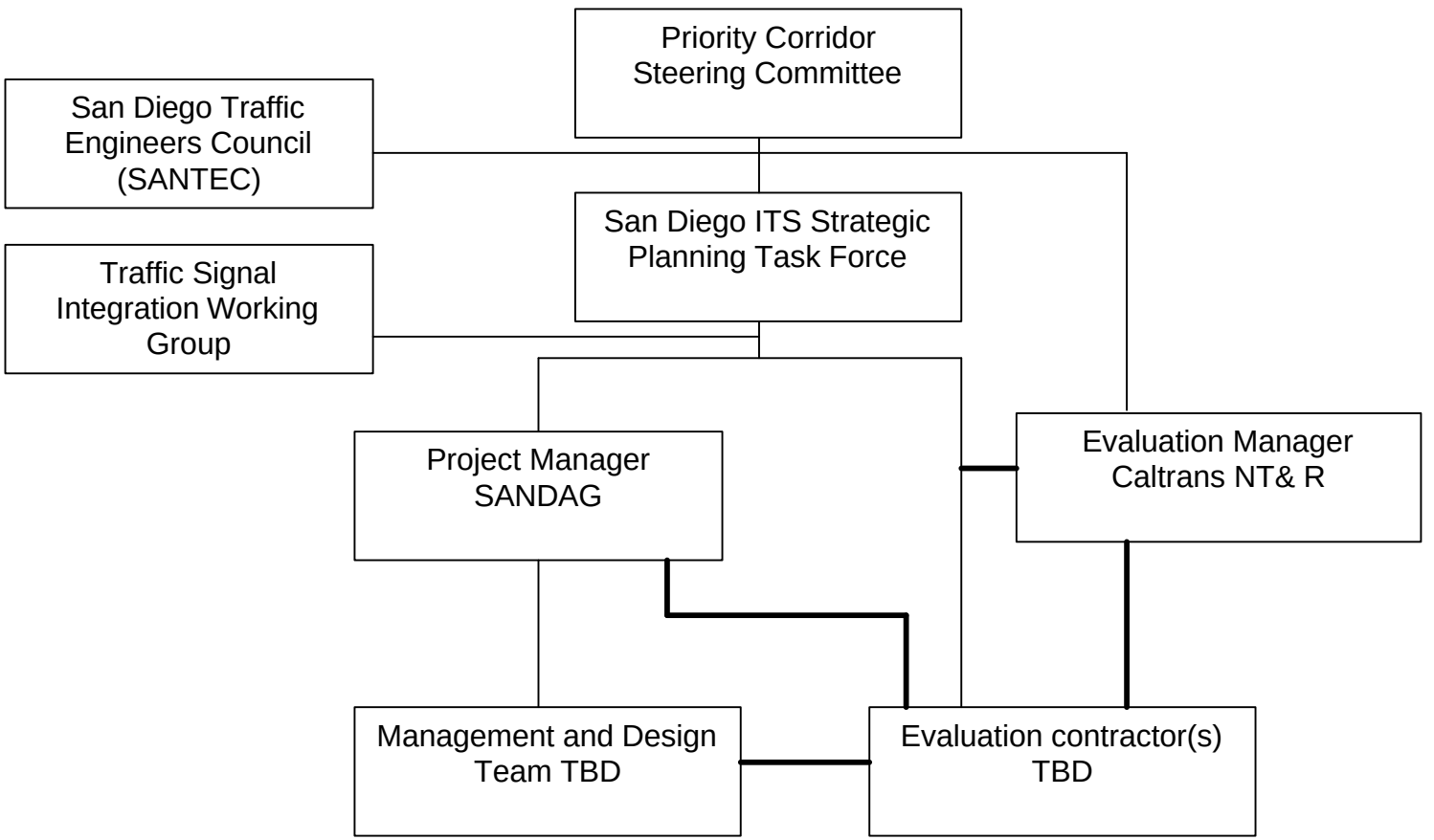
THE TSI PROJECT USES A RANGE OF SYSTEMS AND MARKET PACKAGES

SYSTEMS	MARKET PACKAGES
• Caltrans District 11 ATMS (existing) • Variety of traffic signal operating systems • Others TBD	• Network Surveillance • Regional Traffic Control • Incident Management System • Multi-modal Coordination

THE TSI PROJECT WILL OPERATE AT SHOWCASE LEVEL FOUR FOR CENTER TO CENTER INTEGRATION OF ADVANCED TRANSPORTATION MANAGEMENT SYSTEMS (ATMS)

- The SHOWCASE Program identified six possible levels of Center to Center integration for ATMS:
  - Level 1: Operate independently.
  - Level 2: Share data/video and single function operation.
  - Level 3: Share data/video and imbed cross-jurisdictional responses for major/special events.
  - Level 4: As Level 3 but on a day to day basis.
  - Level 5: As Level 4 with added redundancies for major disasters.
  - Level 6: Centralize some or all management functions.
- The TSI project will operate at Level 4.

THE PROJECT TEAM IS LED BY THE SAN DIEGO ASSOCIATION OF GOVERNMENTS (SANDAG) - OTHER ORGANIZATIONAL LINKAGES ARE PROVISIONAL



THE TSI PROJECT HAS SIX PARTICIPATING AGENCIES

- SANDAG (Sponsor)
- Caltrans District 11
- City of San Diego
- San Diego Transit
- Metropolitan Transit Development Board
- North County Transit District
- In addition, some of the following cities are expected to participate
  - Escondido
  - La Mesa
  - Lemon Grove
  - Encinitas
  - Carlsbad
  - Oceanside
  - Chula Vista
  - San Marcos

THE TSI WORKPLAN COMPRISES TWO PHASES

Phase 1

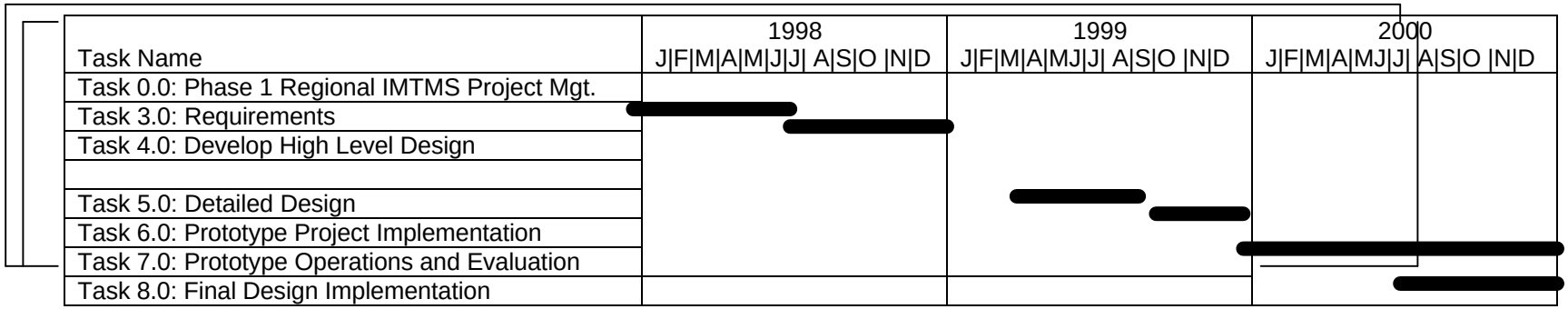
- Task 0.0-Regional Intermodal Transportation Management System (IMTMS) Project Management
- Tasks 1.0 and 2.0-Not part of this workplan
- Task 3.0-Requirements
- Task 4.0-Develop High Level Design

Phase 2

- Task 5.0-Detailed Design
- Task 6.0-Prototype Project Implementation
- Task 7.0-Prototype Operations and Evaluation
- Task 8.0-Final Design Implementation

Schedule and Status...

THE TSI PROJECT HAS NOT YET COMMENCED, ALTHOUGH SOME ACTIVITIES WERE ONGOING AS OF JANUARY 1, 1998



THE EVALUATION APPROACH FOR THE TSI PROJECT IS BASED ON FIVE EVALUATION GOALS DEVELOPED FOR THE SHOWCASE PROGRAM

* Evaluation Goal #1: Assess the performance of the Showcase Program systems
* Evaluation Goal #2: Estimate the costs of the Showcase Program
* Evaluation Goal #3: Assess the institutional impacts of the Showcase Program
* Evaluation Goal #4: Assess the impact of the Showcase Program on management of transportation and traveler information
* Evaluation Goal #5: Evaluate selected transportation system impacts of the Showcase Program projects, including improvements arising from Showcase Program integration

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE

EVALUATION OBJECTIVES	MEASURES
1.1 Document the Showcase Program system development process, including configuration management	1.1.1 Document
1.2 Assess overall system reliability, availability, interoperability, compatibility, ease of use, and scaleability	1.2.1 System Mean-Time-Between-Failures (Failure Defined) 1.2.2 System Availability Equation ("Up Time" and "Down Time" defined) 1.2.3 Degree of System Interoperability as Provided by agency personnel 1.2.4 Assess level of compatibility in physical and operational environment by transportation agency technical staff 1.25 Estimate of system ease of use by transportation agency technical staff 1.2.6 Estimate of Scaleability by transportation agency technical staff
1.3 Assess how Showcase Program integration affected deployment of individual Showcase Program projects and their system performance	1.3.1 Document
2.1 Estimate the costs associated with the Showcase Program's "Design Once/ Deploy Often" Philosophy ·	2.1.1 Actual costs of systems versus estimated costs based on "initial Design Principle" and comparable projects elsewhere
2.2 Estimate Showcase Program operations & Maintenance (O&M) costs	2.2.1 O&M costs annually, based on actual costs six months after system operation start-up
3.1 Identify the impact of the Showcase Program on the O&M procedures and policies of the participating transportation agencies	3.1 .1 Document
3.2 Identify the impact of the Showcase Program on staffing/skill levels and training	3.2.1 Number of O&M staff changes required and/or requested 3.2.2 Estimated and/or actual system training time and costs 3.2.3 Number of additional job classifications created 3.2.4 Chance in employee turnover rate

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
3.3 Document the impacts of emerging standards and a single high level designer concept on the competitive environment	3.3.1 Number of qualified and responsive proposals to system development RFPs 3.3.2 Magnitude of schedule and cost variation in system development 3.3.3 Document number of standards implemented 3.3.4 Number of different firms selected
3.4 Not applicable to TSI	3.4.1 Not applicable to TSI 3.4.2 Not applicable to TSI
3.5 Assess the impact of the Showcase Program on local planning processes, policy development, and mainstreaming of ITS projects	3.5.1 Assess the impacts of the Showcase Program deployment plans on the local planning process, as perceived by SCAG and SANDAG planners
4.1 Assess the extent of regional and inter-regional transportation and traveler information integration between agencies	4. .1 .1 Increased information exchanges 4.1.2 Communications improvements, based on information integration, as perceived by agency personnel 4.1.3 Number of new ITS systems architecture data flows implemented
4.2 Assess the utilization of regional and inter-regional transportation and traveler information bv agencies	4.21 Enhancement of transportation agency performance due to utilization of regional and inter-regional transportation and traveler information, as perceived by agency personnel
4.3 Not applicable to TSI	4.3.1 Not applicable to TSI 4.3.2 Not applicable to TSI

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
5.1 Not applicable to TSI	5.1.1 Not applicable to TSI 5.1.2 Not applicable to TSI
5.2 Assess the safety related impacts of the Showcase projects	5.2.1 Decrease in frequency and severity of accidents in target areas during target time periods 5.2.2 Increase in perceived safety benefits by travelers
5.3 Assess the impacts of the Showcase Projects on traffic congestion	5.3.1 Decreases in delay in target areas during target time periods 5.3.2 Increases in average speed in target areas during target time periods 5.3.3 Decreases in number of stops
5.4 Assess the environmental impacts of the Showcase Program	TBD - please refer to the Cross-cutting Analysis Strategy document
5.5 Not applicable to TSI	5.5.1 Not applicable to TSI 5.5.2 Not applicable to TSI 5.5.3 Not applicable to TSI 5.5.4 Not applicable to TSI
5.6 Not applicable to TSI	5.6.1 Not applicable to TSI 5.6.2 Not applicable to TSI

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS

* System Development and Performance

- Document significant project technical development events, decisions, and trends
- Examine system component (hardware and software) technical performance characteristics
- Assess project development as part of the overall Showcase Program system integration

* Cost Assessment

- Document and estimate project cost, based on publicly available data
- Estimate project cost without the benefit of prior designs
- Estimate project O&M costs, based on a minimum of 6 months of operations cost data

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Institutional Impacts

- Document the impacts and consequences of O&M policy and procedural changes to participating transportation agencies
- Document the requirements for changes in staffing and skills training, and the consequences
- Document the impacts of emerging standards and a single high-level design concept on the competitive environment
- Document and assess the impacts on motor carrier management of operations and administration

* Management of Transportation and Traveler Information

- Investigate and assess the level and relative magnitude of inter-regional information that results from the project (output and input)
- Determine the level and relative magnitude of utilization of regional information by the project and from the project

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Transportation System Impacts
  - Identify and assess traffic congestion impacts at targeted areas and during targeted times
  - Identify and assess the degree of travel mode shifts or other changes in intermodal travel behavior
  - Determine, if possible, any marginal air quality benefits directly measurable from the project
  - Identify and assess transit operations and ridership changes for targeted areas and times
  - Identify and assess any safety benefits directly or indirectly attributable to the system

DATA COLLECTION SOURCES HAVE NOT YET BEEN IDENTIFIED

- Existing sources
  ⇒ TBD

- New sources
  ⇒ TBD

ACTIVITIES EXTERNAL TO THE PROJECT WHICH MAY INFLUENCE DATA COLLECTION HAVE NOT YET BEEN IDENTIFIED

* Construction
    - TBD
* Other
    - TBD

AGENCY DATA ARCHIVAL POLICIES

* TBD

DRAFT

U.S. Department of Transportation
Federal Highway Administration

IMAJINE Project

Evaluation Approach

Southern California ITS Priority Corridor Showcase Program

March 16,1998

*Prepared by: Booze*Allen & Hamilton*

DISCLAIMER

The purpose of this document is to provide a high level overview of the project and its evaluation. This document will be updated on a regular basis, as new information becomes available. All information provided in this document is believed accurate and current, but is not guaranteed.

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  - evaluation activities
  - data collection

THE INTERMODAL AND JURISDICTIONAL INTEGRATED NETWORK ENVIRONMENT (IMAJINE) PROJECT WILL BE THE INITIAL EARLY START SHOWCASE PROJECT IN THE LOS ANGELES/VENTURA REGION

- The goal of the IMAJINE project is to create an integrated network comprising four transportation management systems:
  - Caltrans District 7 freeway management system
  - Los Angeles County Metropolitan Transportation Authority (LACMTA) fixed route transit services
  - Access Services Incorporated (ASI) demand based paratransit services
  - Gateway Cities arterial traffic signal control system.
- The project area is in South East Los Angeles County (SELAC) in the I-l 05 Corridor, between I-605 in the east, and l-l 10 in the west. The l-l 05 Corridor includes three parallel arterials: Firestone, Boulevard, Imperial Highway, and Rosecrans Avenue.
- This initial phase of IMAJINE will serve as a basis for expanding the IMAJINE concept throughout Los Angeles County, including Metrolink and local rail services.
- The Integrated Mode-Shift Management Tool is another 'Early Start' Showcase project in the Los Angeles/Ventura region, which will be integrated with IMAJINE to provide enhanced incident management capabilities,

THE IMAJINE PROJECT WILL DEMONSTRATE COORDINATED ROADWAY AND TRANSIT OPERATIONS IN SOUTHEAST LOS ANGELES COUNTY (SELAC)

- Coordination of freeway <operations with the arterial street operations of the Gateway Cities, to increase operating efficiency in the l-l 05 Corridor under conditions of recurrent and non-recurrent congestion.
- Coordination of LACMTA bus operations with arterial street traffic signal operations, to provide for better management of fixed route bus schedules, and to increase bus speeds.
- Coordination of bus operations between LACMTA fixed route bus services and ASl paratransit operations.
- The potential benefits of IMAJINE are:
  - reductions in travel times
  - improvements in travel .safety
  - improvements in air quality
  - reduced cost of operations

SEPARATE FROM THE IMAJINE PROJECT, THE GATEWAY CITIES ARE DEVELOPING A JOINT TRAFFIC MANAGEMENT CENTER AND ASSOCIATED TRAFFIC SIGNAL SYSTEM IMPROVEMENTS

- This separate project is referred to as the l-l 05 Corridor Project, and is funded by LAC Department of Public Works (LACDPW). The l-105 Corridor Project is not expected to be fully operational until two to three years after the completion of IMAJINE.
- There are 26 Gateway Cities. The following 9 Gateway Cities are IMAJINE partners:
  - Bellflower
  - Compton
  - Downey
  - La Mirada
  - Lynwood
  - Norwalk
  - Paramount
  - Santa Fe Springs
  - South Gate

THE IMAJINE PROJECT IS RELATED TO OTHER SHOWCASE PROGRAM CORRIDOR-WIDE AND REGIONAL PROJECTS

- SHOWCASE Program (funded projects)
  - Integrated Mode-shift Management Tool*
  - LA/Ventura Regional Advanced Traveler Information System*
- SHOWCASE Program (unfunded projects)
  - IMAJINE Expansion
- Other
  - LACMTA Bus Priority Pilot Project, operational date unknown
  - Caltrans District 7 TMC upgrade, expected operational 8/98
  - LACDPW I-105 Corridor Project, expected operational 2002
  - LACMTA Southeast Los Angeles Bus Restructuring Study, study 1998/99, operational date unknown

Note: Projects indicated with a (*) are included in the Showcase Program Evaluation Strategy

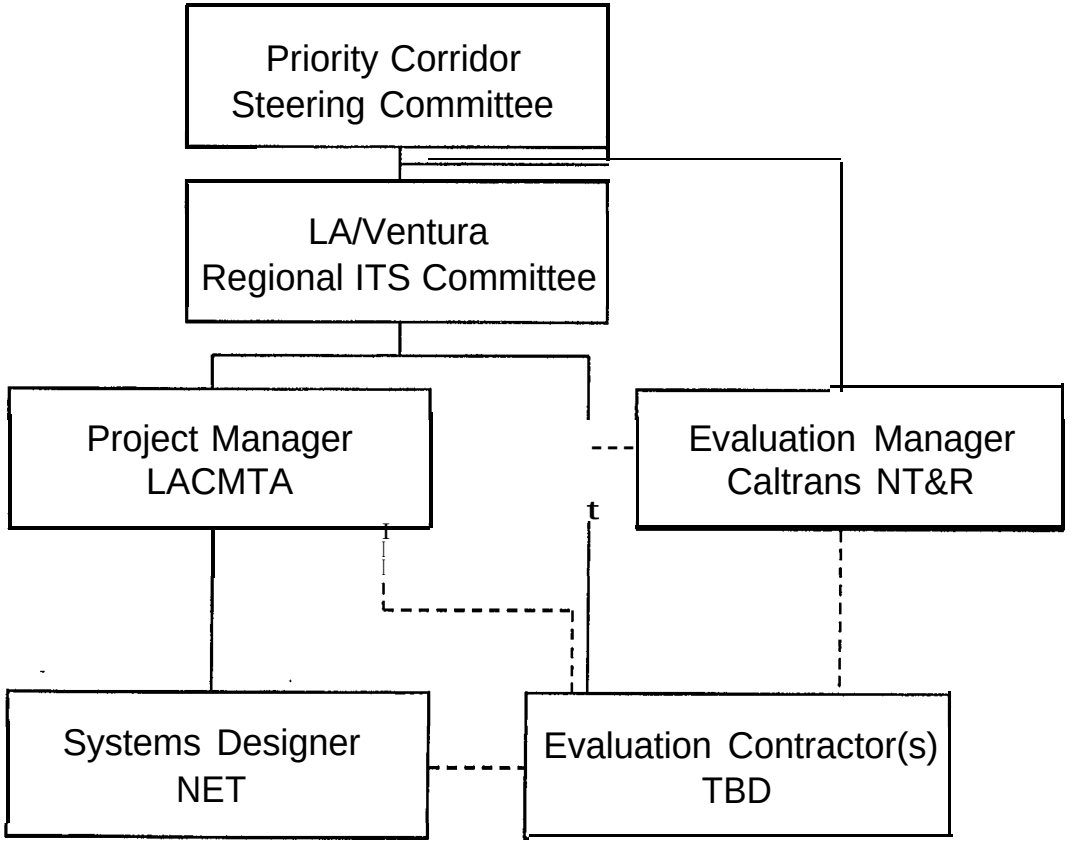
THE IMAJINE PROJECT USES A RANGE OF SYSTEMS AND MARKET PACKAGES

SYSTEMS	MARKET PACKAGES
• Caltrans District 7 ATMS (existing) and traffic signals • LACMTA Bus Operations • LACDPW traffic signals • ASI Dispatch Center • Automatic Vehicle Location on LACMTA and ASI buses • Gateway Cities TMC/ traffic signals • Others TBD	• Network Surveillance • Regional Traffic Control • Incident Management System • Transit Fixed-Route Operations • Demand Response Transit Operations • Transit Passenger & Fare Management • Multi-modal Coordination • Emergency Routing

THE IMAJINE PROJECT WILL OPERATE AT SHOWCASE LEVEL FOUR FOR CENTER TO CENTER INTEGRATION OF ADVANCED TRANSPORTATION MANAGEMENT SYSTEMS (ATMS)

- The SHOWCASE Program identified six possible levels of Center to Center integration for ATMS:
  - Level 1: Operate independently.
  - Level 2: Share data/video and single function operation.
  - Level 3: Share data/video and imbed cross-jurisdictional responses for major/special events.
  - Level 4: As Level 3 but on a day to day basis.
  - Level 5: As Level 4 with added redundancies for major disasters.
  - Level 6: Centralize some or all management functions.
- IMAJINE will operate at Level 4.

THE PROJECT TEAM IS LED BY THE LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY (LACMTA) - OTHER ORGANIZATIONAL LINKAGES ARE PROVISIONAL



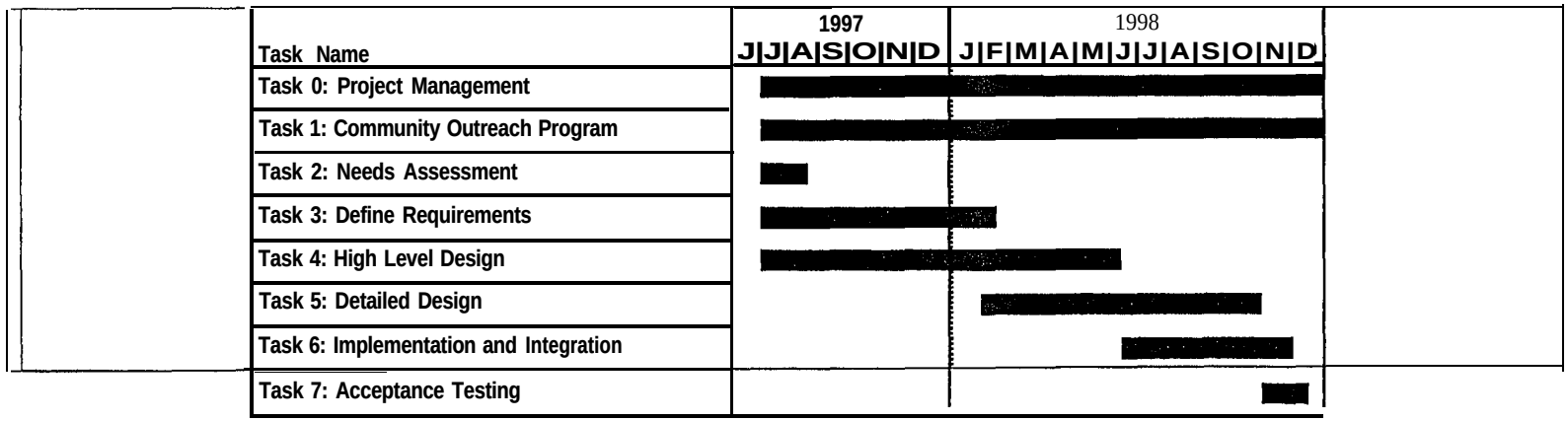
THE IMAJINE PROJECT HAS 13 PARTICIPATING AGENCIES

- Los Angeles County Metropolitan Transportation Authority
  - Planning (Sponsor)
  - Bus Operations
  - Freeway Service Patrol
- Caltrans District 7
- Los Angeles County Department of Public Works
- Access Services Incorporated
- Nine Gateway Cities, as listed on page 6

THE IMAJINE WORKPLAN IS COMPRISED OF 8 MAJOR TASKS

- Task 0.0-Project Management
- Task 1.0-Community Outreach Program
- Task 2.0-Needs Assessment
- Task 3.0-Define Requirements
- Task 4.0-High Level Design
- Task 5.0-Detailed Design
- Task 6.0-Implementation and Integration
- Task 7.0-Acceptance Testing

CURRENT PROJECT SCHEDULE:



Note: A project kick-off meeting took place on June 23, 1997

THE EVALUATION APPROACH FOR IMAJINE IS BASED ON FIVE EVALUATION GOALS DEVELOPED FOR THE SHOWCASE PROGRAM

- Evaluation Goal #1: Assess the performance of the Showcase Program systems
- Evaluation Goal #2: Estimate the costs of the Showcase Program
- Evaluation Goal #3: Assess the institutional impacts of the Showcase Program
- Evaluation Goal #4: Assess the impact of the Showcase Program on management of transportation and traveler information
- Evaluation Goal #5: Evaluate selected transportation system impacts of the Showcase Program projects, including improvements arising from Showcase Program integration

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE

EVALUATION OBJECTIVES	MEASURES
1.1 Document the Showcase Program system development process, including configuration management	1.1.1 Document
1.2 Assess overall system reliability, availability, interoperability, compatibility, ease of use, and scaleability	1.2.1 System Mean-Time-Between-Failures (Failure Defined) 1.2.2 System Availability Equation ("Up Time" and "Down Time" defined) 1.2.3 Degree of System Interoperability as Provided by agency personnel 1.2.4 Assess level of compatibility in physical and operational environment by transportation agency technical staff 1.25 Estimate of system ease of use by transportation agency technical staff 1.2.6 Estimate of Scaleabilitv bv transportation agency technical staff
1.3 Assess how Showcase Program integration affected deployment of individual Showcase Program projects and their system performance	1.3.1 Document
2.1 Estimate the costs associated with the Showcase Program's "Design Once/ Deploy Often" Philosonhv	2.1 .1 Actual costs of systems versus estimated costs based on "initial Design Principle" and comparable projects elsewhere
2.2 Estimate Showcase Program operations & Maintenance (O&M) costs	2.2.1 O&M costs annually, based on actual costs six months after system operation start-up
3.1 Identify the impact of the Showcase Program on the O&M procedures and policies of the participating transportation agencies	3.1.1 Document
3.2 Identify the impact of the Showcase Program on staffing/skill levels and training	3.2.1 Number of O&M staff changes required and/or requested 3.2.2 Estimated and/or actual system training time and costs 3.2.3 Number of additional job classifications created 3.2.4 Change in employee turnover rate

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
3.3 Document the impacts of emerging standards and a single high level designer concept on the competitive environment	3.3.1 Number of qualified and responsive proposals to system development FRPs 3.3.2 Magnitude of schedule and cost variation in system development 3.3.3 Document number of standards implemented 3.3.4 Number of different firms selected
3.4 Not applicable to IMAJINE	3.4.1 Not applicable to IMAJINE 3.4.2 Not applicable to IMAJINE
3.5 Assess the impact of the Showcase Program on local planning processes, policy development, and mainstreaming of ITS ,orojects	3.5.1 Assess the impacts of the Showcase Program deployment plans on the local planning process, as perceived by SCAG and SANDAG planners
4.1 Assess the extent of regional and inter-regional transportation and traveler information integration between agencies	4.1 1 Increased information exchanges 4.1.2 Communications improvements, based on information integration, as perceived by agency personnel 4.1.3 Number of new ITS systems architecture data flows implemented
4.2 Assess the utilization of regional and inter-regional transportation and traveler information by agencies	4.2.1 Enhancement of transportation agency performance due to utilization of regional and inter-regional transportation and traveler information, as perceived by agency personnel
4.3 Not applicable to IMAJINE	4.3.1 Not applicable to IMAJINE 4.3.2 Not applicable to IMAJINE

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
5.1 Assess mode shift and intermodal impacts	5.1.1 Increase in ridership of public transit in target areas 5.1.2 Increase in traveler tendency to consider mode shift during target time periods
5.2 Assess the safety related impacts of the Showcase projects	5.2.1 Decrease in frequency and severity of accidents in target areas during target time periods 5.2.2 Increase in perceived safety benefits by travelers
5.3 Assess the impacts of the Showcase Projects on traffic congestion	5.3.1 Decreases in delay in target areas during target time periods 5.3.2 Increases in average speed in target areas during target time periods 5.3.3 Decreases in number of stops
5.4 Assess the environmental impacts of the Showcase Program	TBD - please refer to the Cross-cutting Analysis Strategy document
5.5 Assess the impact of the Showcase Program on transit operations	5.5.1 Increases in ridership and length of trip attributable to Showcase projects 5.5.2 Increases in operational efficiency in targeted areas 5.5.3 Reduction in selected operations costs 5.5.4 Number of staffing changes reauired
5.6 Not applicable to IMAJINE	5.6.1 Not applicable to IMAJINE 5.6.2 Not applicable to IMAJINE

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS

* System Development and Performance
  - Document significant project technical development events, decisions, and trends
  - Examine system component (hardware and software) technical performance characteristics
  - Assess project development as part of the overall Showcase Program system integration
* Cost Assessment
  - Document and estimate project cost, based on publicly available data
  - Estimate project cost without the benefit of prior designs
  - Estimate project O&M costs, based on a minimum of 6 months of operations cost data

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Institutional Impacts
  - Document the impacts and consequences of O&M policy and procedural changes to participating transportation agencies
  - Document the requirements for changes in staffing and skills training, and the consequences
  - Document the impacts of emerging standards and a single high-level design concept on the competitive environment
  - Document and assess the impacts on motor carrier management of operations and administration

* Management of Transportation and Traveler Information
  - Investigate and assess the level and relative magnitude of inter-regional information that results from the project (output and input)
  - Determine the level and relative magnitude of utilization of regional information by the project and from the project

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Transportation System Impacts
  - Identify and assess traffic congestion impacts at targeted areas and during targeted times
  - Identify and assess the degree of travel mode shifts or other changes in intermodal travel behavior
  - Determine, if possible, any marginal air quality benefits directly measurable from the project
  - Identify and assess transit operations and ridership changes for targeted areas and times
  - Identify and assess any safety benefits directly or indirectly attributable to the system

DATA COLLECTION SOURCES HAVE BEEN IDENTIFIED

* Existing sources
  - Caltrans District 7, volume and occupancy data, collected every 30 seconds, at half mile intervals, and used to calculate average speed
  - LACMTA (Planning) - TBD
  - LACMTA (Bus Operations) - TBD
  - LACMTA (Freeway Service Patrol) - TBD
  - LACDPW - TBD
  - Gateway Cities - TBD
  - ASI - TBD
* New sources
  - TBD

ACTIVITIES EXTERNAL TO THE PROJECT WHICH MAY INFLUENCE DATA COLLECTION HAVE BEEN IDENTIFIED

- Construction
  - ⇒ Roadwork activity is underway on Interstate-5 in Orange County, near the Los Angeles County Line. Completion is planned in phases between April 1999 and March 2001.
  - ⇒ HOV lane construction on Interstate-605 south of State Route-91 to the Los Angeles County Line, is planned for April 1999 through July 2000.
  - ⇒ SR-91 (SR-57 to I-5) widening is underway.

- Other
  - ⇒ TBD

AGENCY DATA ARCHIVAL POLICIES

* Caltrans District 7 data archived for 12 months
* All other agencies - TBD

DRAFT

U.S. Department of Transportation
Federal Highway Administration

Integrated Mode-Shift Management System Project

Evaluation Approach

Southern California ITS Priority Corridor Showcase Program .

March 20,1998

Prepared by: Booz*Allen & Hamilton

DISCLAIMER

The purpose of this document is to provide a high level overview of the project and its evaluation. This document will be updated on a regular basis, as new information becomes available. All information provided in this document is believed accurate and current, but is not guaranteed.

CONTENTS

- Project Overview
  - goals and objectives
  - project description
  - relationship to other projects and the Showcase Program
  - systems and market packages

- Organizational Structure
- Project Workplan
- Schedule and Status
- Evaluation Overview
  - evaluation goals
  - evaluation objectives and initial measures
  - evaluation activities
  - data collection

THE INTEGRATED MODE-SHIFT MANAGEMENT SYSTEM (IMSMS) PROJECT WILL BE ONE OF TWO EARLY START SHOWCASE PROJECTS IN THE LOS ANGELES/ VENTURA REGION

- The goal of the IMSMS project is to mitigate the impact of major freeway incidents by providing travelers with pre-trip information regarding transit services and alternative routes.
- The Caltrans Major Incident Traffic Management Team defines major incidents as those having a duration of two or more hours, with a minimum of two lanes closed. These could include HAZMAT incidents, tanker fires, multiple fatality accidents, or police actions unrelated to traffic incidents. Five to six major freeway incidents occur each week across Caltrans District 7.
- The IMSMS project will initially focus on areas for which transit route, schedule, and fare information is readily available in an electronic form, and maintained in an up-to-date fashion. As a minimum, this is expected to be the case for the Southeast Los Angeles county area, as part of the IMAJINE project.
- Other data elements will include:
  - alternative route information for any given incident location
  - freeway and surface street congestion, closures, detours, and maintenance
  - landmarks and other directional aids
  - traveler services

THE IMSMS PROJECT WILL DEMONSTRATE THE IMPACT OF A RANGE OF PRE-TRIP TRAVELER INFORMATION DEVICES

- Building on previous experience in California, and elsewhere, consideration will be given to use of a range of devices including:
  - user-friendly kiosks, for which location will be very important
  - cable television (channel 35 in the City of Los Angeles is currently available)
  - the Internet
  - telephone/radio advisories
  - dial-up capabilities

THE IMSMS PROJECT IS RELATED TO OTHER SHOWCASE PROGRAM CORRIDOR-WIDE AND REGIONAL PROJECTS

- SHOWCASE Program (funded projects)
  - IMAJINE”
  - LA/Ventura Regional Advanced Traveler Information System*
  - TravelTIP (Orange County)*
  - Fontana-Ontario ATMIS Corridor (Inland Empire)*
  - Corridonnride Advanced Traveler Information System*
- SHOWCASE Program (unfunded projects)
  - IMAJINE Expansion
- Other
  - TBD

Note: Projects indicated with a (*) are included in the Showcase Program Evaluation Strategy

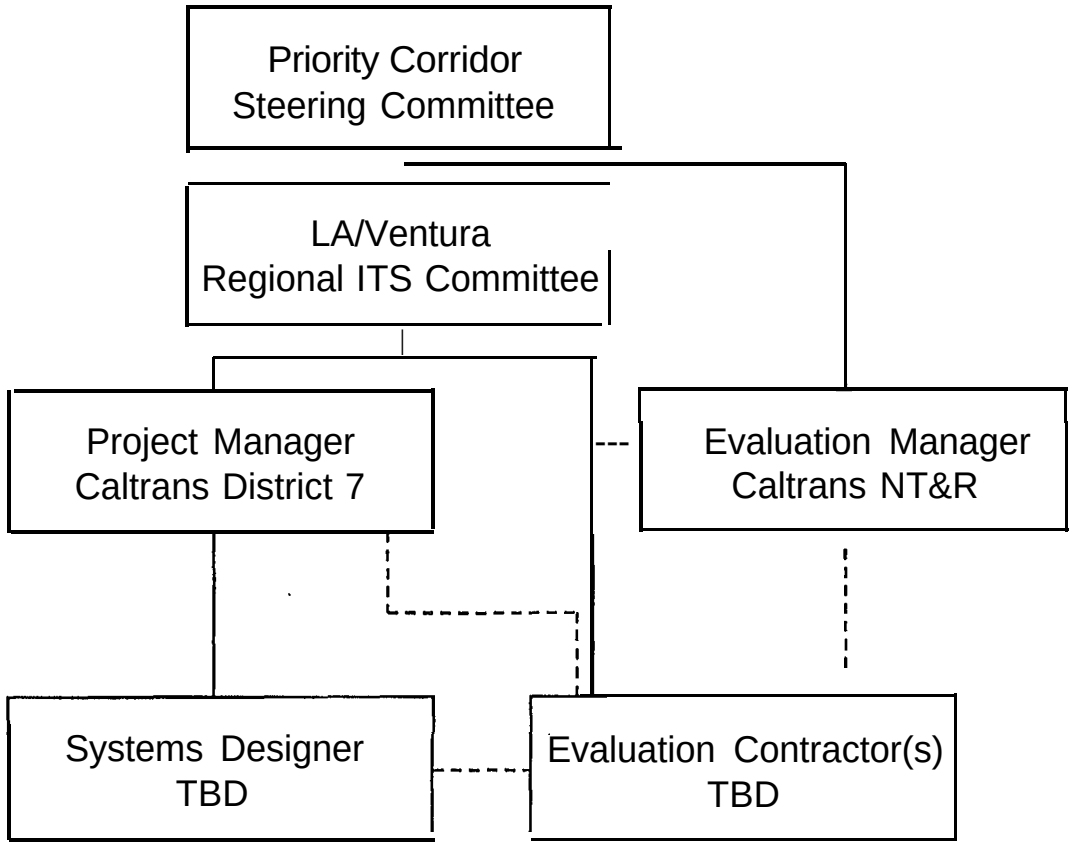
THE IMSMS PROJECT USES. A RANGE OF SYSTEMS AND MARKET PACKAGES

SYSTEMS	MARKET PACKAGES
• Caltrans District 7 ATMS (existing) • Others TBD	• Network Surveillance • Regional Traffic Control • incident Management System • Transit Vehicle Tracking • Transit Fixed-Route Operations • Demand Response Transit Operations • Transit Passenger & Fare Management • Multi-modal Coordination • Broadcast Traveler Information • Interactive Traveler Information

THE IMSMS PROJECT WILL OPERATE AT SHOWCASE LEVEL TBD FOR CENTER TO CENTER INTEGRATION OF ADVANCED TRAVELER INFORMATION SYSTEMS (ATIS)

- The SHOWCASE Program identified four possible levels of Center to Center integration for ATIS:
  - Level 1: Fully distributed i loosely coupled - Internet paradigm.
  - Level 2: Fully distributed - tightly coupled - formal configuration management.
  - Level 3: Hierarchical with distinct fusion or assimilation and dispersion points.
  - Level 4: Centralized Travel Information Center for Priority Corridor.
- IMSMS will operate at Level TBD.

THE PROJECT TEAM IS LED BY CALTRANS DISTRICT 7 - OTHER ORGANIZATIONAL LINKAGES ARE PROVISIONAL



THE IMSMS PROJECT HAS EIGHT PARTICIPATING AGENCIES

- Caltrans District 7 (Sponsor)
- City of Los Angeles DOT
- Los Angeles County Metropolitan Transportation Authority
  - representing the 8 traffic forums for city traffic signal coordination
  - Bus Operators Sub-committee
- Los Angeles County DPW
- South Coast Air Quality Management District
- California Highway Patrol
- Southern California Association of Governments
- Ventura County Transportation Commission

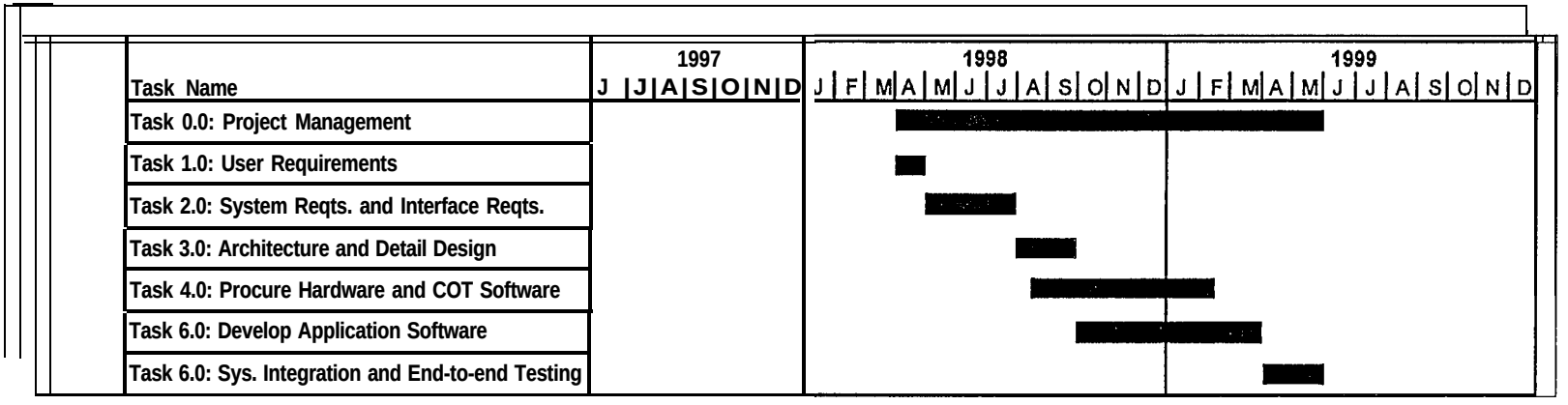
THE IMSMS WORKPLAN IS COMPRISED OF SEVEN MAJOR TASKS

- Task 0.0-Project Management
- Task 1.0-User Requirements
- Task 2.0-System Requirements and Interface Requirements
- Task 3.0-Architecture and Detailed Design
- Task 4.0-Procure Hardware and Commercial Off-The-Shelf Software
- Task 5.0-Develop Application Software
- Task 6.0-System Integration and End-to-end Testing

Notes: The goals and objectives of the IMSMS project will be refined, in conjunction with stakeholders, as part of Task 1.0-User Requirements

The IMSMS Project does not currently include an Outreach Task, which may be critical to the success of developing user awareness of the availability of pre-trip information

THE IMSMS PROJECT HAS NOT YET COMMENCED -THE PROJECT SCHEDULE ASSUMES AN APRIL 1, 1998 KICK-OFF



THE EVALUATION APPROACH FOR IMSMS IS BASED ON FIVE EVALUATION GOALS DEVELOPED FOR THE SHOWCASE PROGRAM

* Evaluation Goal #1: Assess the performance of the Showcase Program systems
* Evaluation Goal #2: Estimate the costs of the Showcase Program
* Evaluation Goal #3: Assess the institutional impacts of the Showcase Program
* Evaluation Goal #4: Assess the impact of the Showcase Program on management of transportation and traveler information
* Evaluation Goal #5: Evaluate selected transportation system impacts of the Showcase Program projects, including improvements arising from Showcase Program integration

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE

EVALUATION OBJECTIVES	MEASURES
1 .1 Document the Showcase Program system development process, including configuration management	1.1.1 Document
1.2 Assess overall system reliability, availability, interoperability, compatibility, ease of use, and scaleability	1.2.1 System Mean-Time-Between-Failures (Failure Defined) 1.2.2 System Availability Equation ("Up Time" and "Down Time" defined) 1.2.3 Degree of System Interoperability as Provided by agency personnel 1.2.4 Assess level of compatibility in physical and operational environment by transportation agency technical staff 1.2.5 Estimate of system ease of use by transportation agency technical staff 1.2.6 Estimate of Scaleability by transportation agency technical staff
1.3 Assess how Showcase Program integration affected deployment of individual Showcase Program projects and their system performance	1.3.1 Document
2.1 Estimate the costs associated with the Showcase Program's "Design Once/ Deploy Often" Philosophy	2.1 1 Actual costs of systems versus estimated costs based on "initial Design Principle" and comparable projects elsewhere
2.2 Estimate Showcase Program operations & Maintenance (O&M) costs	2.2.1 O&M costs annually, based on actual costs six months after system operation start-up
3.1 Identify the impact of the Showcase Program on the O&M procedures and policies of the participating transportation agencies	3.1.1 Document
3.2 Identify the impact of the Showcase Program on staffing/skill levels and training	3.2.1 Number of O&M staff changes required and/or requested 3.2.2 Estimated and/or actual system training time and costs 3.2.3 Number of additional job classifications created 3.2.4 Change in employee turnover rate

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
3.3 Document the impacts of emerging standards and a single high level designer concept on the competitive environment	3.3.1 Number of qualified and responsive proposals to system development RFPs 3.3.2 Magnitude of schedule and cost variation in system development 3.3.3, Document number of standards implemented 33.4 Number of different firms selected
3.4 Document participation by the private sector in the management of transportation and traveler information	3.4.1 Number of private companies involved in Showcase transportation and traveler information management 3.4.2 Number of private company personnel involved in Showcase transportation and traveler information management
3.5 Assess the impact of the Showcase Program on local planning processes, policy development, and mainstreaming of ITS projects	3.5.1 Assess the impacts of the Showcase Program deployment plans on the local planning process, as perceived by SCAG and SANDAG planners
4.1 Assess the extent of regional and inter-regional transportation and traveler information integration between agencies	4.1.1 Increased information exchanges 4.1.2 Communications improvements, based on information integration, as perceived by agency personnel 4.1.3 Number of new ITS systems architecture data flows implemented
4.2 Assess the utilization of regional and inter-regional transportation and traveler information by agencies	4.2.1 Enhancement of transportation agency performance due to utilization of regional and inter-regional transportation and traveler information, as perceived by agency personnel
4.3 Assess the extent to which comprehensive and seamless traveler information was disseminated to, and used by travelers, including the relative effectiveness of different dissemination technologies	4.3.1 Indications of seamless access and favorable response by users 4.3.2 Indications of ease of access by travelers

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
5.1 Assess mode shift and intermodal impacts	5.1.1 Increase in ridership of public transit in target areas 5.1.2 Increase in traveler tendency to consider mode shift during target time periods
5.2 Assess the safety related impacts of the Showcase projects	5.2.1 Decrease in frequency and severity of accidents in target areas during target time periods 5.2.2 Increase in perceived safety benefits by travelers
5.3 Assess the impacts of the Showcase Projects on traffic congestion	5.3.1 Decreases in delay in target areas during target time periods 5.3.2 Increases in average speed in target areas during target time periods 5.3.3 Decreases in number of stops
5.4 Assess the environmental impacts of the Showcase Proaram	TBD - please refer to the Cross-cutting Analysis Strategy document
5.5 Assess the impact of the Showcase Program on transit operations	5.5.1 Increases in ridership and length of trip attributable to Showcase projects 5.5.2 Increases in operational efficiency in targeted areas 5.5.3 Reduction in selected operations costs 5.5.4 Number of staffing changes required
5.6 Not applicable to IMSMS	5.6.1 Not applicable to IMSMS 5.6.2 Not applicable to IMSMS

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS

* System Development and Performance
  - Document significant project technical development events, decisions, and trends
  - Examine system component (hardware and software) technical performance characteristics
  - Assess project development as part of the overall Showcase Program system integration
* Cost Assessment
  - Document and estimate project cost, based on publicly available data
  - Estimate project cost without the benefit of prior designs
  - Estimate project O&M costs, based on a minimum of 6 months of operations cost data

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Institutional Impacts
  - Document the impacts and consequences of O&M policy and procedural changes to participating transportation agencies
  - Document the requirements for changes in staffing and skills training, and the consequences
  - Document the impacts of emerging standards and a single high-level design concept on the competitive environment
  - Document and assess the impacts on motor carrier management of operations and administration
* Management of Transportation and Traveler Information
  - Investigate and assess the level and relative magnitude of inter-regional information that results from the project (output and input)
  - Determine the level and relative magnitude of utilization of regional information by the project and from the project

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Transportation System Impacts
  - Identify and assess traffic congestion impacts at targeted areas and during targeted times
  - Identify and assess the degree of travel mode shifts or other changes in intermodal travel behavior
  - Determine, if possible, any marginal air quality benefits directly measurable from the project
  - Identify and assess transit operations and ridership changes for targeted areas and times
  - Identify and assess any safety benefits directly or indirectly attributable to the system

DATA COLLECTION SOURCES HAVE BEEN IDENTIFIED

* Existing sources
  - Caltrans District 7, volume.and occupancy data, collected every 30 seconds, at half mile intervals, and used to calculate average speed
  - Other agencies - TBD
* New sources
  - TBD

ACTIVITIES EXTERNAL TO THE PROJECT WHICH MAY INFLUENCE DATA COLLECTION HAVE BEEN IDENTIFIED

* Construction
  - Roadwork activity is underway on Interstate-5 in Orange County, near the Los Angeles County Line. Completion is planned in phases between April 1999 and March 2001.
  - HOV lane construction on Interstate-605 south of State Route-91 to the Los Angeles County Line, is planned for April 1999 through July 2000.
  - SR-91 (SR-57 to I-5) widening is underway.
* Other
  - TBD

AGENCY DATA ARCHIVAL POLICIES

* Caltrans District 7 data archived for 12 months
* All other agencies - TBD

DRAFT

U.S. Department of Transportation
Federal Highway Administration

Los Angeles Regional Advanced Traveler Information System Project

Evaluation Approach

Southern California ITS Priority Corridor Showcase Program

March 25,1998

Prepared by: Booz*Allen & Hamilton

DISCLAIMER

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  - evaluation activities
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THE LOS ANGELES/VENTURA REGIONAL ADVANCED TRAVELER INFORMATION SYSTEM (ATIS) PROJECT WILL BE SUPPORTED BY THE TRAVELTIP PROJECT IN ORANGE COUNTY

- The goal of the LA/Ventura Regional ATIS project is to improve mobility by fostering a market for the private sector to offer fully privatized traveler information products As with the TravelTIP project in Orange County, traveler information will enhance the use of existing transportation infrastructure, by providing travelers with route, mode, and time of day options when traveling in or through the LA/Ventura region
- The LA/Ventura Regional ATIS project will collect travel data through a mix of existing sources such as the Caltrans District 7 Transportation Management Center, the LA DOT Advanced Traffic Surveillance and Control (ATSAC) center, and other planned projects within the Showcase Program.
- The LA/Ventura Regional ATIS project will provide services for travelers in the region, including transit users and users of private value added information delivery systems.
- The LA/Ventura Regional ATIS project will initially focus on LA County, but could be extended to include Ventura County at some point in the future.

THE LA/VENTURA REGIONAL ATIS PROJECT IS RELATED TO OTHER SHOWCASE PROGRAM CORRIDOR-WIDE AND REGIONAL PROJECTS

- SHOWCASE Program (funded projects)
  - TravelTIP*
  - Orange County MDI*
  - Corridorwide ATIS"
  - Corridorwide ATMS*
  - Corridorwide CVO*
  - IMAJINE (LA/Ventura)*
  - Integrated Mode-Shift Management Tool (LA/Ventura)*
  - Fontana-Ontario ATMIS*
  - Transit Management System*
- SHOWCASE Program (unfunded projects)
  - Regional Advanced Traveler Information System (San Diego)
- Other
  - TBD

Note: Projects indicated with a (*) are included in the Showcase Program Evaluation Strategy

THE LA/VENTURA REGIONAL ATIS PROJECT USES A RANGE OF SYSTEMS AND MARKET PACKAGES

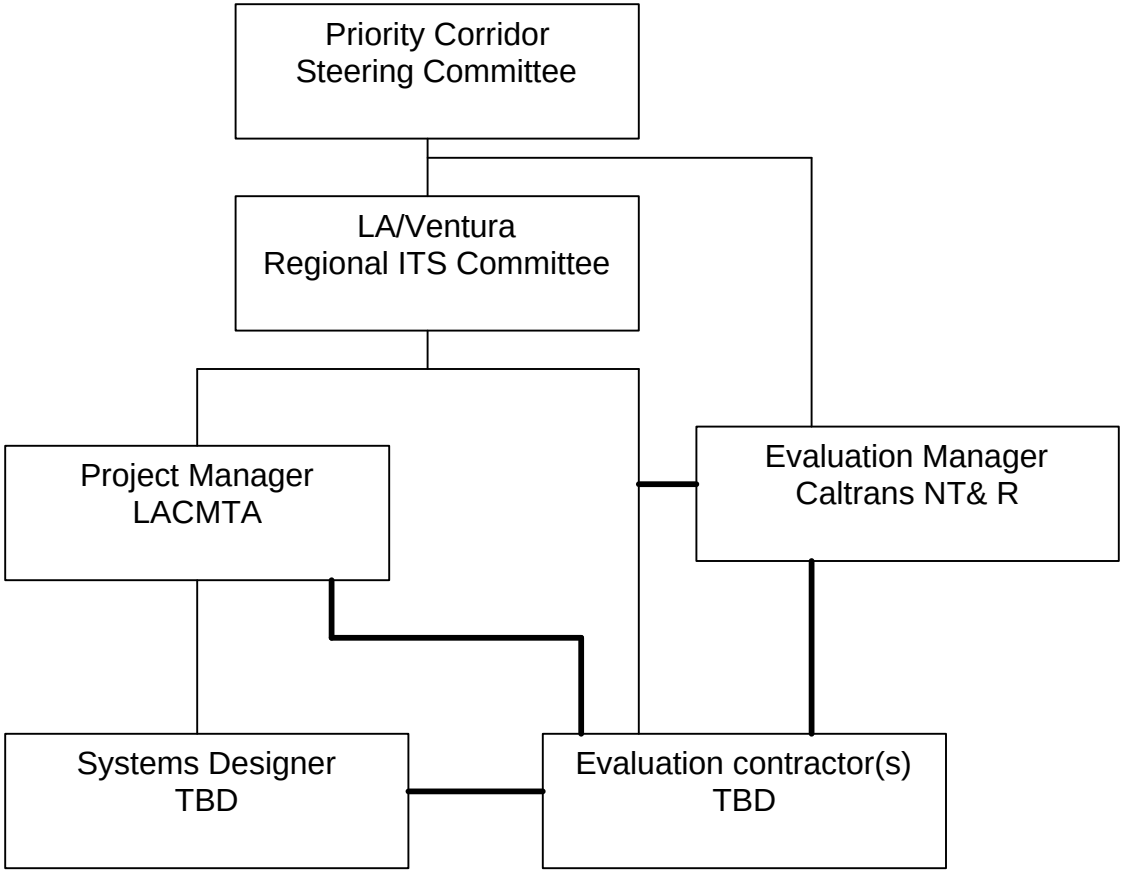
SYSTEMS	MARKET PACKAGES
• Caltrans District 7 ATMS (existing) • LADOT ATSAC center • Others TBD	• Network Surveillance • Incident Management System • Transit Vehicle Tracking • Transit Fixed-Route Operations • Demand Response Transit Operations • Transit Passenger & Fare Management • Broadcast Traveler Information • Interactive Traveler Information • Dynamic Route Guidance • ISP based Route Guidance

THE LA/VENTURA REGIONAL ATIS PROJECT WILL OPERATE AT SHOWCASE LEVEL TWO FOR CENTER TO CENTER INTEGRATION OF ADVANCED TRAVELER INFORMATION SYSTEMS (ATIS)

- The SHOWCASE Program identified four possible levels of Center to Center integration for ATIS:
  - Level 1:Fully distributed - loosely coupled - Internet paradigm.
  - Level 2: Fully distributed - tightly coupled - formal configuration management.
  - Level 3: Hierarchical with distinct fusion or assimilation and dispersion points.
  - Level 4: Centralized Travel Information Center for Priority Corridor.
- LA/Ventura Regional ATIS will operate at Level 2.

Note: Projects indicated with a (*) are included in the Showcase Program Evaluation Strategy

THE PROJECT TEAM IS LED BY THE LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHOURITY (LACMTA) - OTHER ORGANIZATIONAL LINKAGES ARE PROVISIONAL



THE LANENTURA REGIONAL ATIS PROJECT HAS THREE PARTICIPATING AGENCIES

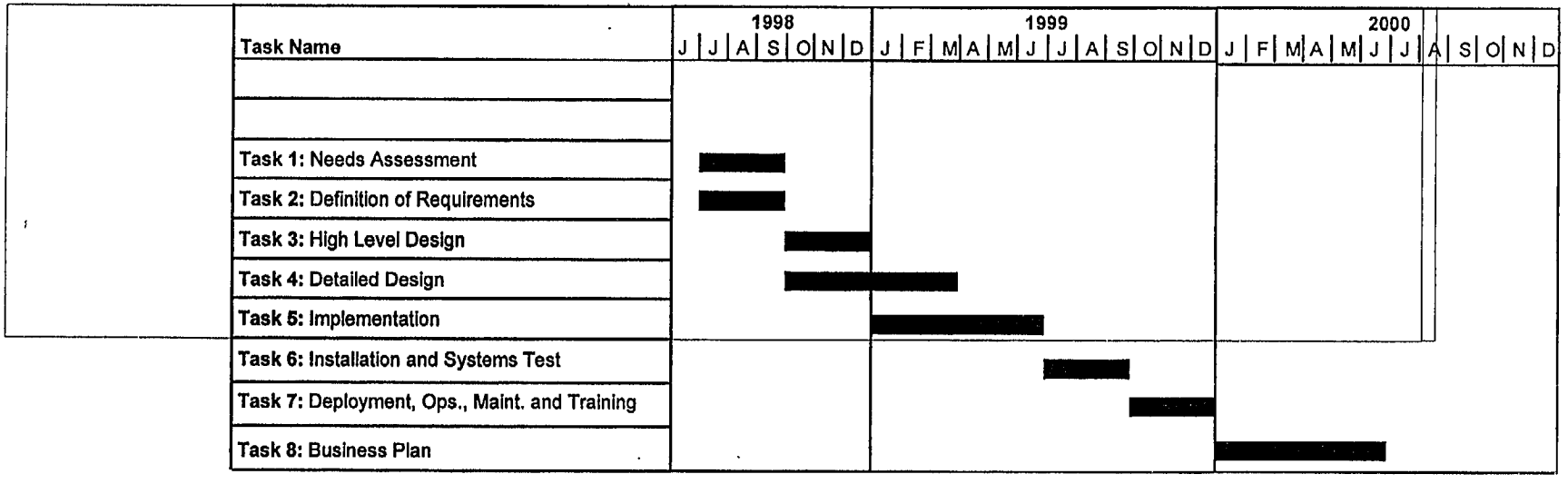
- Los Angeles County Metropolitan Transportation Authority (Sponsor)
- Caltrans District 7
- City of Los Angeles

THE LA/VENTURA REGIONAL ATIS WORKPLAN IS COMPRISED OF EIGHT MAJOR TASKS

- Task 1.0--Needs Assessment
- Task 2.0-Definition of Requirements
- Task 3.0-High Level Design
- Task 4.0-Detailed Design
- Task 5.0-Implementation
- Task 6.0-Installation and System Test
- Task 7.0-Deployment, Operations, Maintenance and Training
- Task 8.0-Business Model

Schedule and Status...

THE LA/VENTURA REGIONAL ATIS PROJECT HAS NOT YET COMMENCED - THE PROJECT SCHEDULE ASSUMES A JULY 1, 1998 KICK-OFF



THE EVALUATION APPROACH FOR THE LA/VENTURA REGIONAL ATIS PROJECT IS BASED ON FIVE EVALUATION GOALS DEVELOPED FOR THE SHOWCASE PROGRAM

- Evaluation Goal #1: Assess the performance of the Showcase Program systems
- Evaluation Goal #2: Estimate the costs of the Showcase Program
- Evaluation Goal #3: Assess the institutional impacts of the Showcase Program
- Evaluation Goal #4: Assess the impact of the Showcase Program on management of transportation and traveler information
- Evaluation Goal #5: Evaluate selected tralisportation system impacts of the Showcase Program projects, including improvements arising from Showcase Program integration

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE

EVALUATION OBJECTIVES	MEASURES
1.1 Document the Showcase Program system development process, including configuration management	1.1.2 Document
1.2 Assess overall system reliability, availability, interoperability, compatibility, ease of use, and scaleability	1.2.1 System Mean-Time-Between-Failures (Failure Defined) 1.2.2 System Availability Equation ("Up Time" and "Down Time" defined) 1.2.3 Degree of System Interoperability as Provided by agency personnel 1.2.4 Assess level of compatibility in physical and operational environment by transportation agency technical staff 1.2.5 Estimate of system ease of use by transportation agency technical staff 1.2.6 Estimate of Scaleability by transportation agency technical staff
1.3 Assess how Showcase Program integration affected deployment of individual Showcase Program projects and their system performance	1.3.1 Document
2.1 Estimate the costs associated with the Showcase Program's "Design Once/ Deploy Often" Philosophy	2.1.1 Actual costs of systems versus estimated costs based on "initial Design Principle" and comparable projects elsewhere
2.2 Estimate Showcase Program operations & Maintenance (O&M) costs	2.2.1 O&M costs annually, based on actual costs six months after system operation start-up
3.1 Identify the impact of the Showcase Program on the O&M procedures and policies of the participating transportation agencies	3.1.1 Document
3.2 Identify the impact of the Showcase Program on staffing/skill levels and training	3.2.1 Number of O&M staff changes required and/or requested 3.2.2 Estimated and/or actual system training time and costs 3.2.3 Number of additional job classifications created 3.2.4 Change in employee turnover rate

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
3.3 Document the impacts of emerging standards and a single high level designer concept on the competitive environment	3.3.1 Number of qualified and responsive proposals to system development RFP s 3.3.2 Magnitude of schedule and cost variation in system development 3.3.3 Document number of standards implemented 3.3.4 Number of different firms selected
3.4 Document participation by the private sector in the management of transportation and traveler information	3.4.1 Number of private companies involved in Showcase transportation and traveler information management 3.4.2 Number of private company personnel involved in Showcase transportation and traveler information management
3.5 Assess the impact of the Showcase Program on local planning processes, policy development, and mainstreaming of ITS projects	3.5.1 Assess the impacts of the Showcase Program deployment plans on the local planning process, as perceived by SCAG and SANDAG planners
4.1 Assess the extent of regional and inter-regional transportation and traveler information integration between agencies	4.1.1 Increased information exchanges 4.1.2 Communications improvements, based on information integration, as perceived by agency personnel 4.1.3 Number of new ITS systems architecture data flows implemented
4.2 Assess the utilization of regional and inter-regional transportation and traveler information by agencies	4.2.1 Enhancement of transportation agency performance due to utilization of regional and inter-regional transportation and traveler information, as perceived by agency personnel
4.3 Assess the extent to which comprehensive and seamless traveler information was disseminated to, and used by travelers, including the relative effectiveness of different dissemination technologies	4.3.1 Indications of seamless access and favorable response by users 4.3.2 Indications of ease of access by travelers

INITIAL MEASURES HAVE BEEN DEVELOPED FOR EACH EVALUATION OBJECTIVE (continued)

EVALUATION OBJECTIVES	MEASURES
5.1 Assess mode shift and intermodal impacts	5.1.1 Increase in ridership of public transit in target areas 5.1.2 Increase in traveler tendency to consider mode shift during target time periods
5.2 Assess the safety related impacts of the Showcase projects	5.2.1 Decrease in frequency and severity of accidents in target areas during target time periods 5.2.2 Increase in perceived safety benefits by travelers
5.3 Assess the impacts of the Showcase Projects on traffic congestion	5.3.1 Decreases in delay in target areas during target time periods 5.3.2 Increases in average speed in target areas during target time periods 5.3.3 Decreases in number of stops
5.4 Assess the environmental impacts of the Showcase Program	TBD - please refer to the Cross-cutting Analysis Strategy document
5.5 Assess the impact of the Showcase Program on transit operations	5.5.1 Increases in ridership and length of trip attributable to Showcase projects 5.5.2 Increases in operational efficiency in targeted areas 5.5.3 Reduction in selected operations costs 5.5.4 Number of staffing changes reauired
5.6 Not applicable to LA/Ventura Regional ATIS	5.6.1 Not applicable to LA/Ventura Regional ATIS 5.6.2 Not applicable to LA/Ventura Regional ATIS

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS

* System Development and Performance
  - Document significant project technical development events, decisions, and trends
  - Examine system component (hardware and software) technical performance characteristics
  - Assess project development as part of the overall Showcase Program system integration
* Cost Assessment
  - Document and estimate project cost, based on publicly available data
  - Estimate project cost without the benefit of prior designs
  - Estimate project O&M costs, based on a minimum of 6 months of operations cost data

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Institutional Impacts
  - Document the impacts and consequences of O&M policy and procedural changes to participating transportation agencies
  - Document the requirements for changes in staffing and skills training, and the consequences
  - Document the impacts of emerging standards and a single high-level design concept on the competitive environment
  - Document and assess the impacts on motor carrier management of operations and administration

* Management of Transportation and Traveler Information
  - Investigate and assess the level and relative magnitude of inter-regional information that results from the project (output and input)
  - Determine the level and relative magnitude of utilization of regional information by the project and from the project

EVALUATION ACTIVITIES WILL BE BROADLY CONSISTENT FOR ALL SHOWCASE PROGRAM PROJECTS (continued)

* Transportation System Impacts
  - Identify and assess traffic congestion impacts at targeted areas and during targeted times
  - Identify and assess the degree of travel mode shifts or other changes in intermodal travel behavior
  - Determine, if possible, any marginal air quality benefits directly measurable from the project
  - Identify and assess transit operations and ridership changes for targeted areas and times
  - Identify and assess any safety benefits directly or indirectly attributable to the system

DATA COLLECTION SOURCES HAVE NOT YET BEEN IDENTIFIED

* Existing sources
  - TBD
* New sources
  - TBD

ACTIVITIES EXTERNAL TO THE PROJECT WHICH MAY INFLUENCE DATA COLLECTION HAVE NOT YET BEEN IDENTIFIED

* Construction
    - TBD
* Other
    - TBD

AGENCY DATA ARCHIVAL POLICIES

- TBD