

**California High-Speed Rail Authority
Request for Expressions of Interest for the
Delivery of an Initial Operating Segment
RFEI HSR #15-02**





TRANSMITTAL LETTER

September 28, 2015

Rebecca Harnagel
California High-Speed Rail Authority
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Sacramento, CA 95814
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Dear Ms. Harnagel-

Acumen Building Enterprise, Inc. is pleased to submit its Expression of Interest (EOI) for the Delivery of an Initial Operating Segment RFEI HSR #15-02.

Based in Oakland, CA, Acumen is certified as a disadvantaged business enterprise (DBE) with the state of California, and has minority business enterprise (MBE), small business (SB) and local business enterprise (LBE) certifications with an array of transportation and state agencies in California and across the nation.

Our expert, diverse teams excel in managing and supporting projects involving complex transit and rail systems. Acumen's overall transit experience with heavy rail clients includes projects for the San Francisco Bay Area Rapid Transit District (BART), San Mateo County Transit District (Caltrain), San Francisco Municipal Transportation Agency (SFMTA), Los Angeles County Metropolitan Transportation Authority (Metro), National Railroad Passenger Corporation (Amtrak), and Washington Metropolitan Transportation Authority (WMATA).

Acumen is submitting this EOI as an individual company. The primary contact for this submittal is:

Walter E. Allen
7770 Pardee Lane, Suite 200
Oakland, CA 94621-1490
walter.allen@acumentransit.com
501.530.3029

Sincerely,



Walter E. Allen
President & CEO



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11.3 FIRM EXPERIENCE

Established in 1994, Acumen is a well-tested and respected professional consulting firm in the transit community. Our expert, diverse teams excel in managing and supporting complex transit systems projects for a variety of clients from transportation agencies such as the San Francisco Bay Area Rapid Transit District (BART), the Washington Metropolitan Transportation Authority (WMATA), and the Los Angeles County Metropolitan Transportation Authority (Metro) to major primes and private corporations.

Our success is based on client satisfaction, great people and quality product deliverables that rely on a seamless, often ground-breaking, interface between information technology and engineering.

Acumen's expertise is in IT communications, transit infrastructure, heavy rail, hardware and software design services, systems design and new technology development. We have gained practical systems experience via in-house development and deployment of contactless smart card systems with complete hardware, software and back-end operating systems for transit agencies in New York, Arizona and at BART. Acumen's relevant heavy rail, transit and complex infrastructure projects include:

- National Railroad Passenger Corporation (Amtrak) Los Angeles Maintenance Facility
- National Railroad Passenger Corporation (Amtrak) Station Security Upgrades North East Corridor
- BART Hayward Maintenance Complex
- BART 19th Street Station
- BART Train Control Modernization Project.
- SFMTA Van Ness Bus Rapid Transit Project
- San Mateo County Transit District (Caltrain)
- Washington Metropolitan Area Transit Authority (WMATA) Smartrip® Program Consultant

Acumen has seasoned staff members with diversified experience in planning, design and construction of railroad and transit infrastructure systems, including high-speed rail. Our staff members have been involved with the planning and design of the California High-Speed Rail System and making state-of-the-art recommendations for implementation. Key high-speed rail project expertise includes:

- Oversaw preliminary and final design for high-speed rail and transit services integration of high-speed rail with the Doha Metro in Qatar.
- Provided services for the West Coast Modernization Rail in the London area as well as Crossrail – London's innovative high-speed rail project.
- Provided design review input for the Pusan to Seoul, Korean High Speed Rail.
- Planned and evaluated track and infrastructure layouts for a design speed of 217 miles/hour (350 kilometers/hour) with Taiwan High Speed Rail. In Taiwan, worked closely with suppliers and contractors in providing design review, costing, coordination, quality planning and scheduling for track systems.



Acumen DBE Status and California Certifications

We are a small, flexible firm with California roots, a global reach, and oversized client-support goals. Acumen is certified as a disadvantaged business enterprise (DBE) with the state of California, and has minority business enterprise (MBE), small business (SB) and local business enterprise certifications (LBE) with an array of transportation and state agencies in California and across the nation.

California Certifications	Type
Alameda County Auditor – Controller Agency	SLEB
Alameda County Transportation Commission	LBE/SLBE
City of Oakland	LBE
Contra Costa County General Services Department	MBE/SBE
Los Angeles Business Assistance Virtual Network	SBE/VSBE
Los Angeles County Metropolitan Transportation Authority (Metro)	SBE
Port of Oakland	LIABE/SBE
San Francisco Bay Area Rapid Transit District	SBE/MSBE
San Francisco Bay Area Rapid Transit District	MBE
San Mateo County Transit District (Sam Trans)/JPB California Unified Certification Program	DBE
Southern California Regional Rail Authority (SCRRA)	SBE
State of California, Department of General Services, Office of Small Business Certification	SB
Supplier Clearinghouse	MBE

CAHSR Small Business Performance Plan

Acumen is responding to this EOI as an independent services provider and is not aligned with any delivery team at this time. Acumen staff offers a wealth of high-speed rail experience that hinges on strong technical backgrounds, and application and hardware systems development expertise. Acumen is reaching out as a DBE to contribute to the delivery of the CAHSR systems and to support and fulfill CAHSR’s DBE goal as stated below:

“The Small Business (SB) Performance Plan to achieve the Authority’s 30 percent utilization goal for Small Business and Disadvantaged Business Enterprises (see Authority’s SB/DBE Program Plan).

“The Authority’s SB/DBE Program establishes a 30 percent Small Business Enterprise (SBE) utilization goal, which is inclusive of a 10 percent DBE goal and a 3 percent Disabled Veteran Business Enterprise (DVBE) goal for a contract resulting from this solicitation”.

“The Authority encourages the Consultant to utilize small business concerns owned and controlled by socially and economically disadvantaged individuals, also known as Disadvantaged Business Enterprises (DBE), in carrying out the contract. The Authority has established a Revised Small and Disadvantaged Business Enterprise (SB/DBE) Program for Professional Services Contracts, and an overall 30 percent goal for small business utilization, to include within the 30 percent goal, a 10 percent goal for DBE.”



11.6 COMMERCIAL QUESTIONS

1. Is the delivery strategy (i.e. combining civil works, track, traction power, and infrastructure) likely to yield innovation that will minimize whole-life costs and accelerate schedule? If so, please describe how. If not, please recommend changes to the delivery strategy and describe how those changes will better maximize innovation and minimize whole-life costs and schedule.

Yes, the combined-element delivery strategy will produce benefits such as yielding innovation, minimizing whole-life costs and accelerating schedule. Lessening the role of the public (government) involvement where possible and increasing and encouraging the private sector involvement will accelerate the schedule and reduce costs. Combining elements such as civil works, track and traction power for example will make delivery works easier to manage and eliminate duplication of effort levels.

In general, the more that any component is treated separately or drawn out of the mainstream, the more involved or layered oversight of all components becomes.

In addition to the design, build, finance, and manage (DBFM) strategy, it is important to examine the possibility of turnkey delivery. Perhaps the entire North Section IOS-North or South Section, IOS-South or a combination of both sections, can be assessed for benefits with respect to turnkey delivery and operations. This current DBFM delivery method has potential to produce cost and schedule savings; however, there is room for improvement.

While combining the different work scopes will achieve certain economies of scale, please ensure that works scope and packages are broken up to allow smaller firms to participate.

2. Does the delivery strategy adequately transfer the integration and interface risks associated with delivering and operating a high-speed rail system? What are the key risks that will be borne by the State if such risk transfer is not affected? What are the key risks that are most appropriate to transfer to the private sector?

The DBFM strategy does transfer integration and interface risks from government to the private sector whether this is adequate or not depends on measurements of success and improvement through what is left to be transferred to the private sector as an option. If all is not transferred to the private sector then government has a stake in management of the delivery and inherits unnecessary risk. Responsibilities and risks associated with materials and labor need to be in the hands of the private sector. Government can advise policy, have a stake in financing, have a role in public safety and environmental protection, but not delivery or implementation.

The current CAHSR business plan anticipates that the government will plan and monitor the project through consulting companies, which means that government takes on risk. Government has been responsible for coming up with the appropriate funding to get the high-speed rail project started, which is a positive, but it is now time to turn this over to the private sector .

Another positive aspect of delivery: government has approved a Small Business Program of an aggressive 30 percent goal for small business participation, including small business DBE, DVBE and others which is very appropriate in distributing participation to spark economic growth and the transfer of risks to the private sector.



3. Are there any other components of a high-speed rail system that should be included in the scope of work for each project (e.g., rolling stock, train operations, stations)? If so, how will this help meet the Authority's objectives as stated in this RFEI?

Clearly the piecemeal, short section packages of 20 miles to 60 miles under the current design-build arrangement are too small to be consistent and truncate acceleration of the high-speed rail program through duplication of effort and other slow-down related factors. To make a significant contribution to the pace of development, these DB sections need to be much longer in future.

Government should consider changing the proposed DBFM model to a design-build-finance-operate-maintain (DBFOM) approach, which adds operations, trains and stations to the private sector role. Government needs only to be in an oversight role associated with financing the project, public safety and environmental protection. The DBFOM model has the potential to attract larger international interests and investment. The end result will be increased competition, better prices and acceleration of the project.

Including all components into the delivery model would lessen potential for discrepancies between the infrastructure owner, the trainset owner and the operations owner. Under the present model, where government intends to procure trainset separately and operations of the system separately, there is much potential for differences, discrepancies and delay.

The design-build infrastructure portions already under construction could be turned over to the private sector developer as incentives to complete a substantial portion of the infrastructure that is required.

4. What is the appropriate contract term for the potential DBFM contract? Will extending or reducing the contract term allow for more appropriate sharing of risk with the private sector? If the Respondent recommends a different delivery model, what would be the appropriate term for that/those contract(s)?

The most appropriate term for the proposed DBFM should not exceed 25 years. This is the average useful life of most attached components. Some unattached infrastructure, such as superstructures, can have a sustainable life exceeding 100 years. This type of infrastructure is consistent throughout the contract terms and passes from one concession on to another.

Risk increases with the age of infrastructure on most components and at a lesser rate when it comes to superstructures.

If the delivery method is changed to DBFOM then the same contract term not exceeding 25 years would be appropriate.

Every five years, there needs to be review and opportunities for the prime organization to assign more small business staff to the project or lay out a long-range small business utilization plan for the entire project. This needs to be specific and monitored throughout the term of the project.



5. What is the appropriate contract size for this type of contract? What are the advantages and disadvantages of procuring a contract of this size and magnitude? Do you think that both project scopes should be combined into a single DBFM contract?

The proposal is to have two DBFM contracts one for IOS North and the other for IOS South; however, a combination of the two into a single contract has the potential to move more risk and responsibility from government and other parties to a single entity. Considering a DBFOM has the potential to move more components of CAHSR to the private sector and combining the IOS sections into one can lessen duplication. The larger the contact size, the more attention will be attracted which would result in lessening costs and transfer of risk. Including trainsets, stations and operations into one parcel will produce more teaming opportunities due to increased scope.

6. Does the scope of work for each project expand or limit the teaming capabilities? Does it increase or reduce competition?

The proposed scope of work through DBFM expands the teaming and competition capabilities with the increased size of the contract. Teaming and competition capabilities could be further increased through combining both IOS into one section. One section would transfer more risk to the private sector and decrease government involvement. With delivery entirely in the hands of the private sector, there can be increased teaming opportunities within the delivery.



11.7 FUNDING AND FINANCING QUESTIONS

7. Given the delivery approach and available funding sources, do you foresee any issues with raising the necessary financing to fund the IOS-South project scope? IOS-North project scope? Both? What are the limiting factors to the amount of financing that could be raised?

The funding sources are the Federal government, State government (Proposition 1A) plus Cap and Trade funds, with the bulk of the contribution coming from Proposition 1A funds. All government funding amounts to less than 25% of the current estimated construction costs. There will be difficulty in securing funding without making major corrective concessions. This measure could include changing the model to a DBFOM and turning more over to the private sector such as stations and train sets resulting if further foreign investment.

8. What changes, if any, would you recommend be made to the existing funding sources? What impact would these changes have on raising financing?

The existing funding sources are inadequate but could serve as seed money to attract further attention to the project, especially international. It is necessary to attract international mega-funding through increasing incentives for investment.

9. Given the delivery approach and available funding sources, is an availability payment mechanism appropriate? Could financing be raised based on future revenue and ridership (i.e., a revenue concession)? Would a revenue concession delivery strategy better achieve the Authority's objectives?

One factor that must be borne in mind here is that ridership on mass transit rail systems usually recovers only a portion of the operating expenses and certainly does not contribute to the extent that ridership revenue can finance maintenance and capital works. Revenue from real estate and business development along the line can be a contributing factor; however, it also is questionable whether this additional revenue can cover maintenance and operations. The CAHSR would exist in a highly competitive environment with airlines and private automobiles as modes of choice by the travelling public.

A revenue concession delivery strategy needs to be considered as this will offer additional means of available financing.



11.8 TECHNICAL QUESTIONS

10. Based on the Authority's capital, operating, and lifecycle costs from its 2014 Business Plan, describe how the preferred delivery model could reduce costs, schedule, or both. Please provide examples, where possible, of analogous projects and their cost and/or schedule savings from such delivery models.

The preferred model DBFM is a partnership between government and public and private entities. Government needs to only be accountable for safety, environmental and initial financing. Government does not need to be involved in contract administration as it is currently in the DB model and in the proposed DBFM model. The more that is transferred to the private sector, the better are the chances of project acceleration. There will also be less government risk.

The government sector must ensure that the small business goals and objectives are monitored and reached throughout the terms of contracts.

11. How does this compare to separately procuring each high-speed rail component (i.e., separate contracts for civil works, rail, systems, power separately)? Please discuss design/construction costs, operating/maintenance/lifecycle costs, and schedule implications.

Government does not have to be involved in piecemeal contracting for multiple components on a high-speed rail network. Separating civil works, rail, power, systems, etc. under government involvement will delay the delivery schedule. One can look at what has been accomplished by government over the past 10 years in California and compare that with other high-speed rail lines internationally. For example, the Taiwan high-speed rail system was designed and constructed within 10 years (1997-2007). Korean High Speed Rail and recent projects in China are other good examples of efficient high-speed rail delivery.

Consolidating components into one delivery package, even just one ISO, will reduce redundant processing, accelerate the schedule and reduce risk because project managers and principals will not be dealing with multiple component tracking but just one or two overall delivery entities.

12. For each project, are there any technical changes to the respective scope of work that would yield cost savings and/or schedule acceleration while still achieving the Authority's objectives? If so, please describe.

Government cannot be involved in technical changes to the scope of work. The scope of work needs to be written and managed by the delivery sector.



ACUMEN KEY STAFF (EXAMPLE)

Robert Pilgrim, PE
Program/Project Manager and Engineer

Education:

Master of Engineering
(Transportation), Memorial
University, NL, Canada

Bachelor of Engineering,
Civil Engineering, Memorial
University, NL, Canada

Years of Experience:
15+

Certifications:

CA PE License #C79157

WA PE License #48569

Professional Engineers of
Ontario (PE License
#36744407)

Order of Engineers of
Quebec
(PE License #44279)

Expertise

Program Management, Project Management and Engineering

Mr. Pilgrim is a professional engineer with more than 15 years of diversified experience in planning, design and construction of railroad and transit infrastructure systems. His background includes construction and operating positions with a major North American Railroad followed by many international assignments. His experience encompasses program and project management, planning, design management, and construction management on complex multidisciplinary infrastructure projects, including mass transit metro, light rail transit, high speed rail, and freight rail.

Mr. Pilgrim has been a senior project manager on numerous projects which included a systems component. He was responsible for the construction and maintenance of infrastructure which included systems. Mr. Pilgrim headed the improvement of on-line performance through systems enhancement. He also managed the transfer of dark territory to computer-aided control systems.

Professional Affiliations:

- American Railway Engineering and Maintenance-of-Way Association (AREMA)
- Canadian Council of Professional Engineers

Acumen Building Enterprise, Inc., Oakland, CA

Program Manager

Managed client services and assignments relating to shop work, stations and train control systems in transit projects with various agencies. Served as Design-Build Manager for the San Francisco Bay Area Rapid Transit District (BART) General Engineering Services - Train Control Modernization Program (TCMP) under the Acumen\Parsons team. Managed Acumen team for the BART Asset Management Program.

North County Transit District, Oceanside, CA

Transportation Program Manager – CDM Smith

Delivered capital projects and program and organization of processes and procedures for reporting departments of North County Transit District which operates passenger rail and bus services in the Los Angeles/San Diego corridor. Developed the path forward of the program management manual which provided daily activity requirements for more expedient initiation, design, construction and close-out of capital projects.

**Middle East North Africa Region**

Transportation Program Manager – CH2M Hill

Provided program management oversight (PMO) for the design-build and construction management contractors for the proposed Arriyadh Metro and BRT projects in Riyadh, Kingdom of Saudi Arabia. The Riyadh metro includes 96 new stations and 177 km of new rail lines with CBTC systems whereas the BRT includes 86 km with 1000km of connected community lines.

Served as transportation program manager for Qatar Railways, Doha, Qatar. Oversaw preliminary and final design proposal for high speed rail and transit services integration with the Doha Metro. Included design-build for track work, passenger stations, systems, control center, depot buildings and drainage systems, and planning logistics for site investigations and construction in an oil and gas congested environment.

La Guajira Thermal Coal Project, La Guajira, Colombia

Program Manager Rail - CH2M HILL, Inc.

Provided program management for the development and design of infrastructure for a railway, port and mine to handle 35 million to 70 million tons of coal per year. Performed design and construction management assessment of consultants and contractors.

San Francisco Bay Area Rapid Transit District (BART), Oakland, CA

On-Call General Engineering Services

Senior Project Manager - Jacobs Engineering

Directed the preparation of specifications and bid documentation for technologically improved heavy equipment for maintenance and rolling stock. Analyzed the relevant issues and provided a range of options for solutions to water intrusion for above and underground stations and tunnels. Developed remedial program based upon solutions from industry: other transit agencies, manufacturers and suppliers.

The National Railroad Passenger Corporation (Amtrak), Washington, DC

Senior Project Manager - Jacobs Engineering

Led successful proposal team to manage the designated ARRA projects involving repair, upgrades, and rehabilitation of capital projects for Amtrak infrastructure.

California High-Speed Rail Authority, San Francisco, CA

West Regional Manager Railroads - Parsons Brinckerhoff

Led proposal team and initial design planning work. Provided oversight of management team in the planning, design, construction and operation of a statewide high-speed 220 mph (354 km/h) rail network to be built in phases. Managed and supervised engineering expertise in development of high-speed rail standards, establishing design criteria and reviewing consultant technical submissions. Provided oversight of start-up of planning, design, construction, and operation of the statewide high-speed (220 mph) rail network to be built in phases. Reviewed technological advancements in systems and infrastructure design for state-of-the-art recommendations in plans and specifications.

Powder River Basin (Coal) Expansion, Sioux Falls, SD

West Regional Manager – Railroads at Parsons Brinckerhoff

Contributed to team that delivered the design-build for the Powder River Basin Expansion proposal for 262 miles of new concrete-tie track with signals and two new rail yards. The project included 72 bridges, grade separations, signals, and communications.



Peninsula Corridor Joint Powers Board, San Mateo, CA

Bridge Replacement Caltrain Corridor - San Mateo Bridge

West Regional Manager - Parsons Brinckerhoff

Performed track work design and construction management for the replacement of four railroad bridges over roadways on the Caltrain double-track commuter line.

Bechtel Corporation (International):

National Rail Recovery Program, London, UK

Senior Project Manager

Provided resident engineer services for Network Rail. Planned and directed construction management in completion of trackwork and related installations. Directly managed contractors to ensure work was completed within the work windows as planned and in compliance with appropriate quality and safety standards. Planned work and supervised staff responsible for rail welding, grinding and non-destructive testing programs, and implemented training and safety programs.

Yucca Mountain Project, Las Vegas, NV

Senior Project Manager

Provided owner's engineer services. Led review, management coordination, and execution of contracts for route selection and conceptual design of a 320-mile freight railroad from Caliente, NV to the planned nuclear repository at Yucca Mountain. Assessed engineering planning for five alternate rail corridors. The project involved development of design criteria and bid packages for route selection, photogrammetric and aerial mapping, and geotechnical, hydrological and conceptual design for the preferred corridor.

Iraq Infrastructure Improvement (USAID)

Senior Project Manager

Performed assessment of the Iraqi rail network comprising 1,367 route-miles (2,200 route-kilometers). Assessed damage sustained during the conflict and evaluated requirements for urgent infrastructure repair through USAID contracts. Proposed track rehabilitation, new track construction, repair facilities, control systems and communications. Required work and travel in an extremely insecure environment.

Inchon International Airport Railroad, Seoul, Korea

Senior Engineering Manager

Provided engineering and managerial expertise for civil works and systems in development and implementation of a 30-year concession for the design, construction and operation of a 37-mile (60-kilometer), 12-station electrified commuter line from central Seoul to the new Incheon Airport. Worked with the owner's engineers to review design for all work, including stations, tunnels, bridges, track, and structures. The system was predominantly underground. Led planning, including: station locations, access and egress for stations, alignment, and electrification of the system. The system had to comply with both international and local government regulatory standards and requirements.

Portland Light Rail Transit (LRT), Portland, OR

Senior Project Manager

Provided engineering expertise in review of design, cost, schedule and construction management for track, structures and systems. Oversaw the installation of track and structures to comply with plans and specifications. Managed regulatory compliance to meet Federal Transit Administration (FTA), Environmental Protection Agency (EPA), state and local requirements. The Portland Airport MAX was a design-build-finance project for a 5.6-mile (9-kilometer) extension of the existing system with the addition of four (4) new stations with provisions for the development of 180 ha of commercial property.



Bechtel Corporation (International):

Taiwan High Speed Rail, Taipei, Taiwan

Infrastructure Manager

Planned and evaluated control systems, track and infrastructure for a design speed of 217 miles/hour (350 kilometers/hour). Worked closely with suppliers and contractors in providing design review, costing, coordination, quality planning and scheduling.

Kowloon Canton Rail Corporation (KCRC), Hong Kong

Track & Structures Manager

Reviewed KCRC's planning, conceptual design, cost estimates, schedule and cash flow in extending East Rail's passenger and freight services. The rail link project included a 3.7-mile (6-kilometer) tunnel and construction of a new port and rail yard for handling containers. Included civil works, systems design and integration.

Aqaba Railway Corporation, Jordan

Track & Structures Manager

Reviewed the design, plans, costs, schedule and site conditions for construction of new rail lines and rehabilitation of the existing lines servicing phosphate mines. Prepared input for solicitations as a privatization and operations concession.

West Angeles Mine, Robe River Railroad, Pilbara, Australia

Track & Structures Manager

Managed and directed the engineering team in evaluating the work of various consultants for the planning design and construction of civil works for the 212-mile (342-kilometer) rail line. Scope of expertise included review of route and infrastructure (bridges and structures) options, establishment of criteria, standards, and design assessment, identification of risks and review of costs and scheduling for civil works, signaling and communication systems and rolling stock.

South Sumatra Railroad Upgrading and 56-Mile (90-Km) Extension, Jakarta, Indonesia

Track & Structures Manager

Designed engineering planning of a new railway line to a deepwater port to handle 20 mtpa of coal. Assignment included direction of the technical team in analyzing critical issues and solutions affecting the design and construction of infrastructure, systems, project phasing, scheduling, quality control and costs.



Te-Chuan Chang, Ph.D., P.E.
Senior Project Scheduler/Senior Program Manager

Education:

PhD, Construction
Engineering and
Management, University of
California, Berkeley, CA

MS, Construction
Engineering and
Management, Clemson
University, Clemson, SC

MS, Transportation/ Traffic
Engineering, National
Taiwan University, Taipei,
Taiwan

BS, Civil Engineering,
National Taiwan University,
Taipei, Taiwan

Years of Experience:
35

Certifications:

California, Professional
Engineer, Civil License No.
45132

Expertise

Project Management/Scheduling/Claims and Schedule Analysis

Dr. Chang is a project controls manager with special expertise in \$100 million-plus projects as well as a licensed professional engineer in California. Renowned for exceeding client expectations, he has extensive experience using Primavera P3/P6 and Microsoft Project (MSP) software programs to develop applications for construction, claims analysis, transit including fare collection systems, information technology development, semiconductor process equipment installation, and semiconductor volume manufacturing facilities.

In multiple-project environments (from several to more than 300 projects), he uses P6 and MSP with Oracle and Microsoft SQL Server databases to develop and implement a vast array of project control and reporting systems which have the capability to directly retrieve all data collected in the P6 databases, organize and then present the data in a variety of software programs (e.g. Microsoft Excel).

For enterprise solutions, such as when implementing Acumen's in-house Acumen Integrated Project Control System (AIPCS), Dr. Chang uses the software modules of Oracle Primavera Enterprise Project Portfolio Management (P6 EPPM R8.3), Primavera Unifier (R9.13), Contract Management (Release 14), Oracle Database 11g/12c, Oracle WebCenter Content (a.k.a. Oracle Universal Content Management), Oracle Business Intelligence (BI) Publisher, Oracle Business Progress Management (BPM), Weblogic 11g/12c, and Oracle AutoVue.

Professional Affiliations:

- American Society of Civil Engineers

San Mateo County Transit District (Caltrain), Menlo Park, CA

Communications Based Overlay Signal System & Positive Train Control Project
Scheduler

Provided lead scheduling services and oversight for Caltrain's CBOSS & PTC including the scheduling of its Back-Up Central Control Facility in Menlo Park, CA to control the wayside installation of the signaling overlay equipment, radio system equipment and telecommunication network. Ensured that the services of subcontractors and major construction equipment required by the project were available at the appropriate time to ensure maximum efficiency and productivity. Worked with the project cost estimate team to determine any cost and schedule impacts and manpower requirements for any requested changes during the project execution.

**San Francisco Municipal Transportation Agency (SFMTA), San Francisco, CA**

Van Ness Bus Rapid Transit (BRT) Project

Task Lead/Senior Scheduler

Leads the Acumen team providing program schedule improvement and maintenance services for the SFMTA's Van Ness BRT project. In response to FTA schedule oversight review comments, Oracle Primavera P6 scheduling software is used to reconcile and expand on schedule assumptions, critical path, project calendars, schedule lags, critical areas of concern and risks, schedule format, schedule quality, structure, and detail, schedule correctness and completeness, schedule components, phasing, and sequencing, scope of work coverage, schedule durations, constraints, schedule element hierarchy, and cost/resource loading. In parallel with program schedule improvements and maintenance, Acumen team assists in the development of Van Ness BRT construction sequencing plans for the SFMTA. These plans provide the SFMTA with a quantitative analysis of several construction sequencing scenarios based on project scope, construction site conditions and constraints, traffic maintenance, construction sequencing logic, construction calendar, and work windows. The updated construction sequencing duration estimates, developed as part of this sequencing plan, are incorporated into the Van Ness BRT program-wide schedule.

Kaiser Permanente National Facility Services (KP NFS), Oakland, CA

Content Management and Integrated Project Controls Consulting Services

System Integrator

Led Acumen technology team providing consulting services to integrate and automate more effective approaches for KP NFS enterprise project portfolio management (EPPM). Developed an Enterprise Dashboard Reporting System (EDRS) for all the subprojects of Kaiser Permanente's Oakland Medical Center, San Leandro Medical Center, Redwood Medical Center, Vallejo Medical Center, and Mt. Diablo Hospital projects. Expanded EDRS approach to Kaiser Permanente's EPPM and implemented the EPPM in Oracle's database, applications, and Fusion Middleware, including Oracle Database 11.2.0.3, WebLogic 11gR1, OBIEE 11.1.1.6.0 and BI Publisher 11.1.1.6.0, WebCenter Content 11.1.1.8.0, Business Process Management 11.1.1.6.0, Primavera P6 Enterprise Project Portfolio Management R8.3, and Primavera Unifier R9.13.

Kaiser Permanente Oakland Medical Center (OMC) Replacement Project, Oakland, CA

Scheduling Consulting Services

Senior Scheduler/System Integrator

Led Acumen scheduling team to convert the 30,000-activity OMC project schedule from P3 to P6 (Release 8.3). Rebuilt work breakdown structures for all the sub-projects and integrated all the sub-projects into a master schedule for the project. Loaded resources (mainly manpower) and recommended methods for tracking manpower usages in the field. Generated earned value reports using the schedule and manpower information. Organized project portfolios and customized the out-of-box P6 Dashboard software program to develop an executive dashboard for controlling progress, monitoring project health (financially) and generating dashboard-style reports. Created an integrated executive master schedule by reorganizing, linking or rolling up the detailed construction activities. Enhanced the executive controls-dashboard and executive master schedule to enable executives and project managers with the drill-down capability for examining schedule issues on each levels of the integrated master schedule according to the work breakdown structure.



Washington Metropolitan Area Transit Authority (WMATA), Washington, DC

SmarTrip® Program Consultant

Master Scheduler

Developed the integrated master schedule for WMATA SmarTrip® Program Single Platform/Nextfare Deployment. Trained managers to use the integrated master schedule. Maintained the schedule and implemented weekly updates and reports as required to support the program. Assessed WMATA's business and technology needs for the project controls and recommended to migrate and integrate WMATA's 14 project schedules (prepared by individual responsible managers) from Microsoft Project software based time-only schedules to a Primavera P6 integrated resource-loaded master schedule. The recommendation was accepted by WMATA.

Valley Metro Rail (VMR), Phoenix, AZ

Central Phoenix/East Valley Light Rail Transit Automated Fare Collection System Project

Master Scheduler

Assisted Scheidt & Bachmann USA, Inc. in providing scheduling services for the VMR automated fare collection system project. Developed and maintained the Master Program Schedule using P3 for the LRT-06-053-FCS contract. The project was substantially completed and went on revenue services on time in October 2008.

Naval Facilities Engineering Command (NAVFAC) Pacific, Joint Guam Program Office (JGPO), Hawaii

JGPO Master Integrated Schedule (MIS) Development Project

Master Scheduler

Supported the U.S. Navy on a task order for supplying technical expertise to complete the MIS portion of a large, multimillion-dollar Environmental Impact Statement. Developed a P6-based MIS, and project controls and database integration methodologies and integrated 48 project schedules (many of them in MSP 2003 or 2007) using P6 software with its Software Development Kit, or Application Programming Interface software components. Converted schedules and organized them into a Primavera Project Portfolio. Developed the MIS with the capability to interface with other scheduling systems, project control tools, and databases. Used Oracle 10g Release 2 as the backend database for the MIS development and ODBC Link to directly link Oracle database schema to the P6 Project Management module for manipulating the project-related data for reports, revisions, and updates. Delivered the final MIS to the client in Primavera P6 with P6 Web Access and in MSP 2003/2007. Upon completing the MIS, trained the appropriate individuals and agencies on schedule maintenance.



Robert D. Murray
Program Manager

Education:

MBA, University of Pittsburgh, Pittsburgh, PA

BS, Industrial Management, Carnegie Mellon University, Pittsburgh, PA

BS, Electrical Engineering, Carnegie Mellon University, Pittsburgh, PA

Years of Experience:
54

Training:

More than 20 educational courses in management, quality, project management, executive presentations, computer programming and marketing

Publications:

Presented Systems Integration at APTA 2002
Fare Collection Workshop

Expertise

Program and Project Management

Mr. Murray is a goal-oriented team leader with a strong work ethic, great interpersonal skills, and a significant record of accomplishments in engineering, contract administration, project management, and transportation system projects. He is skilled at building strong productive teams that contribute innovation and creativity while meeting schedule and cost goals. He has developed contract documents, bids and proposals and managed and negotiated complex multimillion-dollar system projects on a national level and in 16 foreign countries. Mr. Murray has substantial experience in computer and microcomputer control systems. He uses these skills to design and implement leading-edge systems, principally fare collection and revenue management systems in transit agencies. He manages projects, develops system architecture, guides system design, and performs a variety of system implementation tasks.

Professional Affiliations:

- A leader and active participant in developing American Public Transit Association (APTA) Universal Transit Farecard Standards for systems, smartcards, and magnetic tickets
- Frequent speaker at APTA annual Revenue Management Committee meetings

San Francisco Bay Area Rapid Transit District (BART), Oakland, CA

High Speed Ticket Encoder Project

Project Manager

Managed technical services which were provided to BART to develop, design, implement, assemble, test and document the High Speed Ticket Encoder (HSTE-II) device which bulk encodes Hi-Co magnetic strip BART tickets. Oversaw the use of a COTS fare card encoder and packaged the unit with an industrial personal computer and custom software into an integrated hardware and software packaged workstation. Provided the new unit to BART to replace a legacy unit that was more than 30 years old and did not have the capability to encode the current BART fare cards.

Los Angeles World Airports, Los Angeles, CA

Automatic Vehicle Identification System Maintenance

Contract Management

Managed engineering maintenance for the automotive and other vehicles at the Los Angeles Airport. Developed the contract agreement, the required staffing, and associated costs to achieve the level of preventative and corrective maintenance.



Yuma County Intergovernmental Public Transportation Authority, Yuma, AZ

Bus Automated Smart Card Fare Collection System

Project Manager

Ensured accurate and timely delivery of system enhancements and replacement parts for a system previously provided by Acumen. The Fare Collection System is an advanced smart card based system that utilizes the Acumen AcuFare 200 readers, card firmware and back office software designed, implemented and installed by Acumen. The enhancements included modifications to various reports, improvements to card reader initialization and updates to manuals reflecting the various changes.

New York Metropolitan Transportation Authority (MTA)

Customer Information System (CIS) for Staten Island, NY: Purchase and Installation, Including Training and Warranty Projects

Project Manager

Ensured that each deliverable is achieved in a timely and satisfactory manner. Participated in conference calls and managed the development of the installation, maintenance, training documents, test plan documents, and any other documents developed by Acumen staff. Provided oversight on development of training documents and managed test plan and requirements matrix documentation. Acumen staff provided technical writing, communications design and documentation services for VeriFone's Customer Information System project.

Honolulu High-Capacity Transit Corridor Project (HHCTCP), Honolulu, HI

Fare Collection System Options Study Report

Senior Systems Staff/Task Lead

Conducted a study that will provide the HHCTCP a comprehensive analysis from which to make an informed decision in determining the most appropriate fare collection system option for the region. The study addresses technology, station planning, equipment requirements and capital and operating costs for various fare collection options that are presently being used by other transit systems similar to this region in size and complexity.

Washington Metropolitan Area Transit Authority (WMATA), Washington, DC

SmarTrip® Program Consultant

Program Manager

Developed scheduling, schedule adjustments, assisted in providing program staffing, and managed development of technical specifications and program documents. Developed a business rules document and a program plan document. The project team used the program plan document to manage and guide implementation of the project. Additional responsibilities included providing an up-to-date automatic fare collection centric system diagram, developing technical specifications and procurement documentation, and system testing as necessary.

The SmarTrip® Program is the automatic fare collection (AFC) program for the Washington Metropolitan Area Transit Authority (WMATA) that allows contactless smart cards to be used seamlessly as fare media throughout the area served by the agencies participating in the regional SmarTrip® partnership. Acumen's main responsibilities are to ensure that the SmarTrip® fare payment system program is delivered in a timely, responsible, and efficient manner.



National Transit Institute, New Brunswick, NJ
Implementing Contactless Fare Collection Systems
Primary Instructor

Assisted in the development of a national training program for transit industry professionals. Directed the course that trained industry professionals to develop structured programs tailored to the needs of an agency or region. Major presenter of the pilot course to transit industry professionals in Sacramento, CA.

City of Phoenix, Phoenix, AZ
The City of Phoenix - Farebox Contract
Program Manager

Assisted Scheidt & Bachmann with the installation of more than 700 fare boxes in buses operated by the city of Phoenix. Developed the quality assurance/quality control (QA/QC) program that ensured the plans and specifications clearly defined the hardware, software, documentation, and training necessary to implement the project in a cost-effective and time-sensitive manner. Acumen professionals were present at the production facility and on-site to monitor farebox equipment and systems post-installation, pre-revenue service testing, and systems validation.

Miami-Dade County Transit, Miami, FL
Program Management Consulting Services for the Implementation of the People's Transportation Plan
Technical Consultant

As lead technical consultant for Miami-Dade Transit's Universal AFC System, assisted with the development of the request for proposal, evaluated bidder questions, contributed to a license agreement, and assisted in developing the system architecture.

San Francisco Bay Area Rapid Transit District (BART), Oakland, CA
Automatic Fare Collection Modernization Program
Systems Engineer

Developed an encryption key management procedure in support of BART's deployment of a contactless smart card. Conceived and wrote the procedure to manage securely the generation, transportation, storage, and maintenance of security procedures. The document also provided all checklists and forms necessary to implement the procedure and described the roles and responsibilities of various participants in key management. Developed a quality assurance (QA) procedure for incoming inspections and for acceptance of smart card deliveries from suppliers. The document depicted the process flow and provided all of the checklists and forms necessary to implement the procedure. It also described the roles and responsibilities of various participants in the QA process. Developed a comprehensive procurement specification for contactless, limited-use (disposable) smart cards. The procurement specification described all of the technical requirements necessary for BART to purchase the smart cards.

San Francisco Bay Area Rapid Transit District (BART), Oakland, CA
Division Manager in Systems Engineering

Managed the design, implementation, testing, and integration of a real-time supervisory data acquisition system for AFC equipment. The system featured a secure online connection to a banking network for credit and debit card purchase authorization using VISA, MasterCard, Discover Card, and bank debit cards. The system employed state-of-the-art IBM e-Servers using Linux and managed and gathered operational information on smart cards, tickets, currency, and equipment. Managed ongoing enhancements and



engineering support for the 24/7 operation of the data acquisition system. Also managed the design, implementation, and installation of a computer display system to monitor and control BART's AFC equipment in station agent booths. Managed a team that produced a website to provide configurable analysis of passenger flow, cash receptacle status, equipment location and performance, train location, and other management information data. Managed the development or participated in a team development of a variety of contract documents.

Led the technical evaluation for the regional smart card project (TransLink®) proposals and procurement for all San Francisco Bay Area transit agencies. Participated in drafting and reviewing BART's participation agreement in the Regional smart card systems. Participated in the review and establishment of BART's fare collection business rules for smart cards and ticketing. Led the design, development, and implementation of hardware and software to integrate the TransLink® smart card into BART's legacy fare gates. Guided design engineering for all smart card initiatives for BART equipment and systems including access to the BART system and building access by employees and others. Led the development of a new magnetic stripe data format for BART that combined all existing ticket types into one common format and provided serial number tracking. Managed the development and implementation of ticket procurement specifications and quality control for magnetic stripe tickets used in fare collection. Also managed the engineering support for BART's \$90 million AFC Modernization Program and the design and implementation of the following: software to enable data analysis for magnetic ticket readers in stations, retrofitted equipment, gates, and change machines. Oversaw the redesign of 32 printed circuit boards for BART's legacy AFC equipment.

American Public Transit Association (APTA), Washington, DC

Consultant, Contributor

Provided major contributions to APTA contactless fare media standards, including work on the Universal Transit Farecard Standards.

Texas Instruments, Inc., Dallas, TX

Manager, Manufacturing Automation Systems

Managed three cost centers with more than 35 professionals in Dallas, TX and Detroit, MI. Led multiple projects in proposal, costing, pricing, design, implementation, and installation of control systems, including turnkey systems for clean-room environmental control and deionized water, robotic manufacturing, and laser photolithography systems.

Scientific Systems Services, Melbourne, FL

Director, Factory Automation

Directed design, implementation, installation, and integration of computer control systems in warehouses, rapid transit, and manufacturing industries.

Westinghouse Electric Corporation, Pittsburgh, PA

Projects Manager, Contracts Manager, Sales Application Engineer

Managed design, implementation, installation, and integration of central train control computer systems for BART and Sao Paulo Metro in Sao Paulo, Brazil in addition to many other systems. Managed systems development; negotiation and administration of multi-national contracts; and agreements for projects in rapid transit, electric power, metals, petrochemical, and aerospace industries.