Department of Energy
Electronic Commerce

EC-Web Project Plan

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Assistant Secretary for Human Resources and Administration
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1. INTRODUCTION

The Department of Energy Electronic Commerce Task Force was formed to assist the Department with achieving the presidential target of January, 1997 to implement Electronic Commerce/Electronic Data Interchange (EC/EDI) to the maximum extent possible within the small purchase process. Having successfully met that target date, the EC Task Force is revisiting the agency's long-term strategy for expanding upon EC/EDI activities throughout the agency. It has been determined that WWW-based technologies and incorporating an Intranet/Internet approach for enhancing the existing EC/EDI infrastructure will provide DOE with a foundation to maximize its current architecture and move forward with the future. This Project Plan details CDSI's approach for assisting DOE with fulfilling the DOE vision for conducting electronic commerce.

Foreword

The purpose of this document is to present Computer Data Systems Inc.'s (CDSI) plan for managing the software development of an Electronic Commerce World Wide Web (EC-Web)-based business system for the Department of Energy (DOE) Procurement Office of Special Projects and Management Systems. The intent of this document is to identify information about the EC-Web project including deliverables, schedules, risks, dependencies, assumptions, estimates, project teams, and change management. This plan will:

- Provide a general description about the DOE Electronic Commerce system being developed
- Identify schedules and activities to be performed to develop and manage the product
- Identify resources for adequately staffing the EC team
- Provide a basis for management and the EC Team to successfully track and control the project
- Establish a common information source with consolidated data referencing the project
- Establish schedule baselines and a detailed work breakdown structure

The EC-Web Project has been divided into three phases:

- **Phase I**: System Development Phase, May 1997 - March 1998

- **Phase II**: System Deployment and Enhancement Phase, April 1998 - December 1999

- **Phase III**: Ongoing Operation and Maintenance Phase, January 2000 - ongoing

Phase I encompasses the design, development, integration, testing and acceptance of EC-Web. Phase II incorporates the installation and national deployment of the system, the expansion of the vendor outreach program, the introduction of a system support infrastructure, and system and

EDI enhancements for the infrastructure. Phase III will provide for the ongoing operation, support, and maintenance required for EC-Web.

This project plan provides details for each stage included in Phase I: Planning, Preparation, Software Design, Programming and Integration, System Testing and Acceptance. The EC-Web project plan may require addenda and adjustments at the conclusion of each stage of development. Any modifications to this project plan will be documented accordingly in the Preface section of this project plan. A separate Project Plan will be written for Phase II and Phase III.

Background

Over the past 2-1/2 years, the DOE EC program has progressed from a pilot program evaluation of EC technologies and procurement systems to the DOE selection of an EC architecture, infrastructure, procurement system, and EDI gateway services.

The DOE Electronic Commerce Task Force has analyzed the results of a one-year pilot program that was conducted at various locations throughout the agency. By executing a System Evaluation Plan, the EC Task Force has analyzed various procurement applications to assess the ability of each application to meet the Department requirements as defined by a DOEwide standardization task force. The procurement application that was selected for agency-wide evaluation is the Small Purchasing System (SPS), which is under development in-house by the Pittsburgh Energy Technology Center (PETC). The gateway selected to provide EDI capability to SPS is Government Acquisition Through Electronic Commerce (GATEC), which was developed by Lawrence Livermore National Laboratory (LLNL).

1.1 Current Environment

The current EC environment comprises four integrated but separate elements:

- automated procurement system
- financial system
- electronic commerce gateway
- centralized communications hub that allows the gateway to interconnect to commercial Value-Added-Networks (VANS).

The current DOE EC implementation includes the Pittsburgh Energy Technology Centers (PETC) Small Purchasing System (SPS) integrated with the University of California's Lawrence Livermore National Laboratory (LLNL) "GATEC Lite" EDI gateway and hub technology, coupled with VAN Telecommunications contracts and agreements. The current environment also includes the integration of the Departmental Integrated Standardized Core Accounting System (DISCAS) via an interactive interface.

SPS is developed with ORACLE RDBMS utilizing SQL/NET client-server. The SPS executables are housed on a Windows NT server, and the database engine is a SCO UNIX implementation with Windows 3.1, 95, and NT Clients. DISCAS is a departmental accounting system that contains various levels of financial and budget information. DISCAS is developed with TurboIMAGE DBMS. DISCAS is running on the Hewlett-Packard MPE/IX operating system. GATEC hardware is the mechanism that translates SPS data into ANSI X12 format, and provides the vehicle to transmit procurement data to DOE's trading partners.

Currently, DOE is rolling out the SPS/DISCAS/GATEC implementation to the five major DOE procurement sites so that each site may begin processing small purchasing in an automated manner. This project, EC-Web, introduces the long-term strategy for replacing the present procurement application with a web-based procurement application for DOE's electronic commerce long-term solution.

1.2 Previous Activities

The following list highlights the progression of the DOE EC project to date:

- Conducted EC pilot programs at various DOE field sites to compare commercial off-the- shelf (C
- Conducted DOEwide conference to compare procurement applications with a system evaluation criteria
- Selected PETC's Small Purchasing System, the procurement application to be deployed throughout DOE.
- Conducted gateway evaluation criteria to select best gateway to integrate with SPS.
- Selected GATEC for gateway services and hub services
- Formed Purchasing Standardization Task Force to define procurement and financial requirements and define one DOEwide process for small purchases.
- Developed strategy to integrate SPS,GATEC, DISCAS, and incorporate end-user requirements.
- Tested integrated system
- Developed short-term plan for deploying integrated system to selected DOE field sites.
- Developing long-term plan for deploying Web-based EC system throughout DOE.

For this past year, the focus of the DOE EC project has been to migrate the procurement application, SPS, from a VAX/VMS platform to a client/server environment. The GATEC software that was originally developed for the Air Force, was modified by LLNL to meet DOE's requirements. The new GATEC gateway software, GATEC-Lite version 1.0, has been integrated with the client/server version of SPS to create the DOE EDI-enabled automated procurement environment.
Both of these components were then integrated into the DOE departmental accounting system for the pilot of an interactive interface between the financial application and the procurement application.

In addition to establishing one DOE centralized gateway from SPS to LLNL, the Hub Services offered by LLNL have also been integrated within the present DOE EC infrastructure to allow

DOE to pilot the LLNL Hub Services such as connections to Gatec Certified Value Added Networks (VANS), DOE Vendor Registration processes, transaction archival and transaction routing capabilities.

To address the functional requirements of SPS, the Purchasing Standardization Task Force (PSTF) Committee, comprising representatives throughout DOE, was formed to standardize the automated procurement environment by identifying end-user requirements and by defining one standardized process flow for the procurement process.

To address the functional requirements for the financial process, another committee was formed comprising financial representatives throughout DOE to standardize the process for obligating funds for a small purchase procurement.

1.3 Project Goal and Objectives

Goal

It is the goal of this project to provide DOE with a fully-functional, web-based system that can be deployed to DOE Headquarters, field sites, and program offices, inclusive of the functional requirements defined by the PSTF. By accomplishing the following objectives, the goal can be obtained. Each defined objective can be gauged with the corresponding measure of success that follows:

Objective 1: Ensure the selection of the development environment that will provide the framework for developing a web-based electronic commerce infrastructure.

Measure of Success: Analyze results from prototype by using defined evaluation selection criteria and select the development environment: database engine, web server, development tools, etc.

Objective 2: Develop one operational web-based DOE-wide automated procedure application.

Measure of Success: The development of EC-Web, the procurement application to be deployed throughout the agency.

Objective 3: Redevelop, modify, and/or install the LLNL gateway capable of supporting DOEwide X12 activities, including routing, translating, and distributing data. Integrate the Electronic Commerce Communications Infrastructure to handle e-mail-based EDI transactions by utilizing existing Perl Scripts.

Measure of Success: The integration of the LLNL gateway with the EC-Web Application.

Objective 4: Provide proper channels for DOE's Vendor Community to easily conduct business with DOE via EDI. Integrate EC-Web with process for Automatic Registration and Tracking of Vendors.

Measure of Success: Providing a web-based system integrated with a vendor registration process to accept the registration (838s), and modifications (838Cs), support EDI Vendors, and track trading partner information required for completing a small purchase.

Objective 5: Streamline and Standardize the Procurement Process, Financial Process, and the Distribution Process. Identify one standard DOE baseline system and freeze requirements.

Measure of Success: Development of EC-Web and acceptance of the functionality by comparison to the Cross Reference Matrix.

Objective 6: Convert from the manual procurement process to the automated procurement system for daily use by the DOE staff. Develop a Conversion Plan for converting from the manual process to an automated operational environment.

Measure of Success: Document and execute operational and support plans focusing on end-user procedures and the process flow of documents for using EC-Web.

Objective 7: Educate buyers and contracting officials on EDI.

Measure of Success: Execute an introductory EDI class.

Objective 8: Train end-users on EC-Web.

Measure of Success: Develop and document two training programs: HQ training program for the prototype and a DOEwide training program refined from lessons-learned during the prototype.

Objective 9: Incorporate the use of EDI X12 Standards for improving internal and external exchanges of data via multiple platforms. Select and implement a singular standard and specification mapping that will meet procurement and financial needs both internal and external to DOE.

Measure of Success: Mandate and adopt the specification mapping by EC-Web, the gateway (GATEC), VANs, VASs, and the Trading Partner community.

Objective 10: Develop a deployable web-based small purchasing system that can be utilized throughout the agency thaat performs the following functions.

Functional Requirement: Prepare/send a requisition to a procurement office.

Measure of Success: Have a procurement application that can demonstrate the creation of a requisition showing approvals, funds reservation, and status updates. The procurement application should have the capability to route requisitions for approval, provide parallel routing, select multiple approval paths and levels, and report the status of requisitions.

Functional Requirement: Issue a solicitation.

Measure of Success: Have a procurement application that can demonstrate the creation of a solicitation, Request for Quotation (840), from one or multiple requisitions, select specific vendors for bidding, broadcast a bid, adhere to ANSI X12, compile multiple requisitions into one solicitation, and the capability to issue a solicitation to multiple and/or directed vendors.

Functional Requirement Receive a Quote.

Measure of Success: Receive a Reply to Request for Quotation (843) by importing incoming bids and processing bid evaluations for review and selection to build a Purchase Order.

Functional Requirement Make an Award.

Measure of Success: Have a procurement application that can provide an automated process for converting a bid into a purchase order and supporting the creation and issuance of a Purchase Order/Award (850), create corresponding Public Award Notices (836) and send 836s to all bidders, and convert multiple bids into a purchase order.

Functional Requirement Record receipt of goods and services.

Measure of Success: Have inventory control checking and reporting requirements implemented to complete the procurement process.

Objective 11: Develop a web-based system capable of supporting the existing Trading Partner Community that uses VANS registered with the LLNL Hub.

Measure of Success: Ability to adequately provide support for the vendors doing EDI-based procurements.

Objective 12: Establish connectivity to Trading Partners and Service Providers (VANs) and incorporating services to support the agency. Integrate EC-Web with the LLNL Hub.

Measure of Success: Modify existing LLNL VAN Agreements to incorporate DOE's functional requirements.

Objective 13: Interface with the financial system DISCAS by providing electronic and interactive feeds for maintaining accurate balances for procurement obligations and payment information.Ensure that EC-Web functionality includes certification of funds available

Measure of Success: Have the procurement application demonstrate the capability of completing the process of funds reservation and obligation in DISCAS, generating a CFA number from DISCAS back directly into the procurement application, reconciliation to the amount of the reservation, and to provide creation of the flat files in ASCII format specified in the DISCAS Requirements Document.

1.4 User Groups

EC-Web will be developed for the benefit of all DOE users that have any involvement with the life cycle of a small purchase procurement, including but not limited to:

- HQ, Office of Procurement Operations
- Program Offices
- Field Sites
- Finance

The primary end-user community will comprise:

- Requisitioners
- Buyers
- Managers
- Division Chiefs
- Funding Managers
- Buyers
- Lead Buyers
- Contracting officials

1.5 Product Overview

The following list provides a high level illustration of the functionality that will be contained within the product:

- processing requisitions
- automated routing of documents to approvers, special approvers, and funding managers
- interactive interfaces to DISCAS for funds reservation/obligation
- forwarding to buyers for complete life cycle processing: including creating solicitations, bid evaluation, purchase order processing, and invoice processing
- interact with system users via a commercial Internet browser
- interact with DOE Trading Partners via the LLNL Hub and its respective VANs
- comply to ANSI X12 standards for conducting EDI Database

The basic concept of operations for the procurement application is that each user of the system will have internet access and will use a commercially available web-browser running on a local workstation and will securely access a central procurement server. The user will access the EC-Web application via a web browser Secure Socket Layer (SSL) service. Once securely attached to the server, additional user authentication and database access controls will be utilized to support DOE procurement security requirements.

The EC-Web application will enforce the business rules for processing requisitions, manager approvals, request-for-quotations (solicitations), bid evaluations, and issue an award. The EC-Web application utilizes an HP Virtual Terminal Service to provide an interactive reservation and obligation with the DOE DISCAS financial accounting system.

REQUISITION

Each requisition will have unique routing capability based on user selection of the appropriate approval path. Approve/decline checkboxes will be supplied for each Approving Official. It is envisioned that separate in-boxes will be used to move documents through the document process flow.

SOLICITATION

Upon successful approval of a requisition, the buyer will have the capability to create a solicitation from one and/or multiple requisitions. One-to-one Request for Quote transactions will be written to a flat file that will be passed from the EC-Web application to the GATEC Gateway. The file will then be translated into a valid 840, ANSI X12 DoD 3010 implementation convention transaction set enclosed in a secure E-mail envelope and mailed to the LLNL Hub for further transmission to the VAN, and then to the vendor. The vendor will generate a Functional Acknowledgement (997) when reading the 840, and the 997 will flow back to the Gateway via

E-mail. The gateway will open, translate the 997, and match up the Gateway Tracking Database against the issuing RFQ issued by GATEC. The gateway will match the transaction identifier with the original RFQ number before presenting it to EC-Web.

The gateway will track the time and date of issuance of the original 840 and provide an E-mail notification to the issuing buyer if receipt by the vendor has not been successful. The buyer will have the capability to review the status of all outstanding RFQs at any time.

The buyer will have the capability to issue solicitations to several vendors or a predetermined list of vendors. GATEC will issue multiple one-to-one transactions as a single buyer action, and the gateway will handle each transaction as an independent one-to-one 840.

The buyer will have the capability to issue one-to-public 840s, in which case a solicitation is sent to all VANs responsible for dispersing to their respective vendors. The Gateway will transmit a public RFQ to the Hub, where copies of the RFQ will be made for each VAN. Each VAN will have a special address to receive PUBLIC RFQs, and the hub will receive a 997 back from each VAN that will be matched against the originating RFQ. Notification will occur if a VAN does not respond within a specified period. Transaction Statuses will be tracked and E-mail will be used to provide feedback for problems.

AWARD

EC-Web will provide the decision tools for the buyer to prepare an award. There will be an interactive interface to the DISCAS financial system by using a Virtual Terminal Emulation for reservation and obligation processing of financial data pertinent to each transaction. Upon the successful completion of a reservation/obligation, the Certification Funds Availability (CFA) number will be supplied back to EC-Web, indicating a successful interface. In the event that the reservation/obligation process is not successful, an error code will be supplied back to the buyer and/or system administrator. Each error code will have a corresponding predefined error message associated with it. In the event that the reservation/obligation could not be processed because the HP3000 is down, the interface program will retransmit for a preset time.

An award will not be able to be processed if a CFA number is not generated or if the reservation/obligation process is not successful. The award will be passed to the Gateway which will make an entry in a local gateway table that will match the PO number against the transaction identification issued it by the translator. The gateway will translate the flatfile award into the equivalent ANSI X12 850, place it into an E-mail envelope, and send it to the Hub. The Hub will determine whether it is a direct transaction, archive and readdress it and transmit it to the VAN, and on to the vendor. The 997 process will be matched to the entry in the local Gateway table. Statuses will be checkable and E-mail messages will be generated if 997s are not received within a preset timeframe.

When an award is issued as a result of a one-to-one solicitation, no public award summary (836) will be issued. When a one-to-several 840 is issued, each losing bidder will receive an 836. For public RFQs, the gateway will issue an 836 to public for each VAN. Each VAN will acknowledge receipt of the 836.

The interface between the Gateway Services and procurement application will need to be modified from interfacing with SPS, to interfacing with EC-Web. The Gateway Services software (GATEC-Lite V1.0) will be used for translation from flat file to/from ANSI X12 and for workflow monitoring.

EC HUB

The hub services will remain exactly the same as the present architecture. The Hub Services performed at LLNL will be for VAN connections, E-mail protocol conversion, vendor registration, transaction archival, and transaction routing. The detailed information pertinent to vendor registration will reside within the EC-Web. The hub will be the central E-mail handling and distribution center and will communicate with the VANS. Vendor Registration will also be handled by the Hub. The Hub will not open the E-mail unless it is a Vendor Registration. Short utilities can be written to search information on all 840s that pass through the Hub. Each Vendor Registration will be processed in the Hub-resident database and a registration confirmation is returned to the vendor. The gateway will forward to EC-Web the registration confirmation and a copy of the valid registration.

1.6 Project Scope

The scope of work covered in this proposal encompasses the development, implementation, and support of a Web-based procurement application, Electronic Commerce/Electronic Data Interchange (EC/EDI) Gateway Services, and communication services. This configuration will support the DOE small procurement process and establish a platform for Departmental EC activities.

CDSI proposes the development of a World Wide Web-based small purchasing system that will allow DOE to meet PSTF requirements, automate secure DOE-wide small purchasing, and transition DOE to an EC environment that will support future technology and vendor markets. Additional benefits of this solution include positioning DOE to continue to make automation advances in the procurement arena (e.g., large contracting).

EC-Web Phase I will include the baseline functional requirements as approved by DOE. Functional areas that will not be automated in Phase I include: automated shipping and receiving interfaces, automated credit card processing and reconciliation, interactive updates to DISCAS for invoicing, electronic payments, and electronic funds transfer.

Table 1. EC-WEB Components and Corresponding Requirements

We have organized the scope of work into five EC-Web project components that will meet DOE business needs. The chart below identifies each component followed by its associated requirements and its ID Association from the detailed work breakdown structure.

WWW	BACK-END RDBMS	DOE GATEWAY	MODULES	LEGACY SYSTEM INTERFACES
Web-based Front-end for Requisitioners 137				
Web-based Front-end for buyers to issue solicitations and calculation of bids 161	Comply with Procurement Staff Functional Requirement Document 73	Application Program Interfaces (API): Procurement Application, Grants Application, Other DOE applications. 187	Routing Module 143	DISCAS Program Interface 151
Web-based Front-end for buyers to issue Purchase Orders 169	Database structures and relationships for Purchasing, Vendor and Financial Fields already defined 88	Transaction set Auditing and tracking 222	Internet/Intranet Communication 197	HP 3000 Data Communication interface 178
Interface to RDBMS via CGI Scripting 179	Interface to webserver via CGI Scripting 179	ANSI X12 Translation 188 840,843,850,997,824,194: 224	Notification 217	Reservation, Obligation File Specification 155
Web browsers 198	Establish rules for compliance checking 196	EDI Gateway Perl Script process 180	Messaging 217	Funds Control integration 154
Front End Screens: Requisition 75 Solicitation 76 Financial Interface 77 Bid Evaluation 78 PO 79 Invoice 81 System Admin. 82 Reporting 83	Requisition, Solicitation, PO, field validation 134	Translation Mapping: 194 DOD 3010 Implementation Convention 190	Scanning, data entry, faxing, imaging, printing 187	Security 109
Security 110	Approval Processes 143	Internet/Intranet Services 198	Security 110	
WWW Technology platform 61	Bid Evaluation 161	Security 110		
	Funds Certification & Funds Control 151	E-mail (PEM, S-MIME) 225		

1.7 Major Milestones

Following are the major EC-Web project milestones and their estimated completion dates. The activities detail is provided in the EC-Web project work breakdown structure (WBS). Additional schedule and deliverables information is provided in the master schedule, section 3.7.

Milestone	**Target Date**
Exit Planning Stage	05/07/97
Exit Preparation Stage	06/16/97
Exit Software Design Stage	08/05/97
Exit Programming and Integration Stage	11/28/97
Exit System Testing and Acceptance Stage	03/16/98
Exit System Development Phase	03/30/98
Exit Installation/Deployment Stage	03/31/98
Exit Program Development Stage	12/01/99

2. PROJECT ORGANIZATION

2.1 Development Model

The development of EC-Web will follow the DOE Software Engineering Methodology (SEM). The SEM is the lifecycle methodology standard for all DOE system development projects that integrates project management, software engineering and Quality Assurance processes. Additional information about the SEM Development Model can be researched via the U.S. Department of Energy Software Management and Quality Assurance Home Page at http://www.hr.doe.gov/sem/smpqa_01.htm. The lifecycle model can be used as-is or tailored for any software development project. Tailoring of the SEM lifecycle for this project includes conscious modifications to several stages, including modification to the number and types of expected documents. Listed below are the specific deviations from the SEM medium system model that CDSI has decided to take with the understanding that these deviations will not increase the risk associated with the successful completion of this project.

Documentation Standards

The documentaiton for EC-Web will be compliant with IEE standards as follows:

- ANSI/IEEE Guide to Software Requirements Specifications
- IEEE Guide to Software Design Descriptions
- IEEE Standard for Software User Documentation

Planned Deviations - Stages

These changes reflect customization to the Software Engineering Methodology for a Intranet/Internet software development project.

SEM Reference Numbers	SEM Methodology Stages	EC-Web Methodology Stages of Development
3.1 through 3.10	Planning	Planning
4.1 through 4.11	Requirements Definition	Preparation
5.1 through 5.12	Functional Design	Software Design
6.1 through 6.12	System Design	
7.1 through 7.12	Programming	Programming and Integration
8.1 through 8.7	Software Integration and Testing	
9.1 through 9.9	Installation and Acceptance	System Testing and Acceptance
		Installation and Deployment

- The Planning Stage will contain no deviations from the SEM lifecycle methodology standard for EC-Web.

- The Requirements Definition Stage has been renamed as the Preparation Stage. This was a conscious decision since the Preparation Stage will emphasize the determining of the development environment components that will be used in the Design Stage.

- The Functional Design Stage and the System Design Stage will be combined within the Software Design Stage. This distinction will assist with the management of the project specific to the software design.

- The Programming Stage will be combined with the Software Integration Stage and will be called Programming and Integration Stage.

- However, the Testing Stage will not be combined into the Programming and Integration Stage. Rather, the Software Integration and Testing Stage will be System Testing and Acceptance Stage.

- The Installation Stage will be combined with the Installation and Deployment Stage.

Project Plan Revisions

Each Stage will have an In-Stage Assessment, and Stage Exit. This Project Plan will be revised, as needed, at the end of each stage. The impact of any changes will be evaluated accordingly, and the Stage Exit process will be used as the vehicle to secure approval of the revised plan.

Planned Deviations - Deliverables

Each deliverable and work product will be reviewed by an independent Quality Assurance Analyst to ensure compliance with applicable standards.

Planned deviations in deliverables will be as shown in the table on the following page.

SEM Methodology Stages	EC-Web Methodology Stages of Development	Deliverables	
		EC-Web Planned Work Products	Deviations from SEM Work Products
Planning	Planning	• Proposal • Project Plan • WBS • Quality Assurance Plan	• Prototype instead of Feasibility Study
Requirements Definition	Preparation	• Acquisition and Installation Plan • Detailed Process Flow • Concept of Operations • Functional Requirement Document • Configuration Mgmt Strategy	• No deviations
Functional Design System Design	Software Design	• Design Entities/Dependencies • Logical Model • Table Structures • Database Schema • Functional Design Document • Screen Designs • Cross Reference Matrix • Security Plans • Training Plan • System Test/Acceptance Plan • Conversion Plan • Programming Specifications	• No deviations
Programming Software **Integration** and Testing	Programming and Integration	• Site Installation Plan • Software • System Documentation Draft	• Field Site Installation Plan (Will be completed in the Software Design Stage)
Software Integration and **Testing** Installation and Acceptance	System Testing and Acceptance Installation and Deployment	• Test Results • Operational System • System Documentation	• ANSI X12 Mappings will be delivered as an additional work product • SEM does not incorporate EDI Methodology

The Planning Stage has two additional deliverables: Project Proposal and the detailed Work Breakdown Structure (WBS).

- In lieu of a Feasibility Statement in the Planning Stage, a prototype will be developed in the Preparation Stage that will provide feasibility assertions derived from the evaluation criteria for the selection of the development environment.

- The Analysis of Benefit and Cost will not be produced in the Planning Stage.

- The Field Site Installation Plan will be completed in the Software Development Stage rather than the Programming and Integration Stage due to issues that require resolution prior to that stage.

2.2 Project Team

The following chart defines the project team for the EC-Web project.

Development Team	**Services and Support**	**Approvers**
Project Manager	Independent Consultants	User Point of Contact
Configuration Manager	Documentation Specialist	Technical Monitor
Senior Systems Analyst	Trainer	Client Representative
Senior Lead Developer	Security Specialist	Quality Assurance
Senior DataComm Engineer	LAN Engineer	
Senior Programmer/Analyst (1)	Acceptance Tester	Project Manager's Manager
Programmers (2)	LLNL Hub Operations	System Owner

2.3 Roles and Responsibilities

The following chart defines the roles and responsibilities of the members of the project team and their function at stage exit.

Note: Due to staffing fluctuations, if a particular person is unable to fulfill his/her responsibilities, it will be the responsibility of the manager overseeing that area to ensure a replacement, with appropriate skills and experience, on a timely basis.

Role	Name	Org.	Project Development Responsibility	Stage Exit Function
System Owner	Steve Mournighan	HR-53	Verifies developers' understanding of the application purpose and design. Has overall responsibility and accountability for system and data. Helps resolve conflict.	Approve
User Point of Contact (POC)	Ellen Colligan Juanita Delair	HR-53 CR-50.1	In representing the procurement and finance user community, acts as the single point of contact for approving functional requirements project deliverables and changes. Resolves conflicts.	Approve
Client Representative / Technical Monitor	Andy Yocke	HR-43	Reviews project deliverables. Represents the field's interests and ensures that the organization's information needs are met.	Approve
Quality Assurance Contact	Andy Bicocchi	Quality Assur. CDSI	Reviews and approves project deliverables from QA perspective. Reviews plans and deliverables for compliance with applicable standards. Provides guidance and assistance on SEM process matters.	Approve
Project Manager's Manager	Bob Miller	CDSI	Provides support and guidance to the project manager and team, ensures project staffing. Resolves conflict across organizations. Facilitates communications.	Approve
Project Manager	Kevin Shaver	CDSI	Responsible for daily planning and control of the project. Coordinates resolution of issues. Manages and coordinates technical effort. Performs adequate and timely staffing. Provides regular and timely communications. Prepares and administers project plans. Tracks and reports progress.	Conduct

Role	Name	Org.	Project Development Responsibility	Stage Exit Function
Senior Systems Analyst	Jill Schwartz	CDSI	Responsible for Functional Requirements, Training, Support, Operation, Documentation, EDI. Acts as single point of contact for DOE user points of contact for finance and procurement.	Support
Sr. Lead Developer	Paul Walker	CDSI	Designs user interface for the application. Writes or delegates the writing of all programs related to the application.	Support
(Senior) Programmers	Bill Luch	CDSI	Designs user interface for the application. Acts as primary author of Design document. Writes or delegates the writing of all programs related to the application.	Support
Programmer	Mark Bohler	CDSI	Assists the Designer/Programmer in writing programs.	Support
Configuration Manager	Kevin Shaver	CDSI	Prepares the Configuration Management Plan. Handles configuration management activities.	Support
Independent Tester	Ellen Colligan	HR-53	Conducts testing of the application at all stages of development.	Support
Acceptance Tester	Ellen Colligan Juanita Delair Michael Raizen	HR-53 CR-50.1 HR-561.1	Evaluates the application for overall operability and ease of user interface at acceptance.	Support
Documentation Specialist	Marsha Proctor	CDSI	Writes the user and programmer manuals.	Support
Trainer	CDSI DOE Contract	CDSI	Assists in the development of the Training Plan. Trains EC-Web users.	Support
LAN Engineer	John Li	CDSI	Provides internal consulting, testing, and support.	Support
DataComm Engineer	Jay Rosansky	CDSI	Provide gateway, scripting, security, and ANSI X12 translation	

Role	Name	Org.	Project Development Responsibility	Stage Exit Function
Security	Jay Rosansky	CDSI	Provides guidance in the development of the Computer Security Protection Plan.	Support
Security	Frances Woodward	HR-53	Reviews for compliance with DOE policy	Support

2.4 Problem Escalation

Problem situations are to be resolved in an orderly and timely manner. The severity of the problem will dictate the persons responsible for resolving and the time period allowed for sufficient resolution. If no decision is made about the conflict in the amount of time stated, the project manager will proceed forward at risk, but will notify the System Owner and Technical Monitor of impact of risk.

Project Manager Resolves conflicts within the development team that revolve around the functional aspects of the application (3 business days). Enforces policies/procedures that must be implemented. Consults with the senior area manager to resolve difficult problems (3 business days).

User POC Resolves conflict among the development team and the primary users in determining the priority of requirements when resources are limited (7 business days).

System Owner Resolves conflict among the development team, user POC, project manager in situations where differences about project scope or schedule occur or where funding issues arise (7 days).

3. MANAGEMENT APPROACH

3.1 Management Priorities

The project team is committed to meeting the project objectives and will priorities activities in the most efficient manner to meet or exceed predetermined milestones and deadlines.

- The highest priority is to develop a product that meets or exceeds the baseline system.
- The next priority is to minimize new software development time by maximizing the use of available software design and development tools and when the opportunity exists, to reuse existing software that has already been developed for the DOE EC environment.
- This is followed closely by delivery of the tested and operational system on the planned delivery date.
- The next priority is to have in place a plan that provides a quick deployment strategy that will maximize the capabilities of the internet to allow for field site rollout in a short period of time.

3.2 Project Tracking and Control

The complete project schedule will be detailed within status reports. The actual completions will be tracked against what was planned. The Project Manager will put all line items (activities, tasks, and subtasks) of the development lifecycle stages on the weekly status report with a deliverable date corresponding to each task, as the work begins for a given line item.

- Structured walkthroughs of deliverables will be conducted with both DOE and the CDSI EC Team to ensure high content quality and removal of defects.
- In Progress Reviews will be conducted with CDSI Corporate.
- In Stage Assessments will be conducted with an independent Quality Control Analyst for quality assurance verification.
- Stage Exits will be conducted with DOE to review the deliverables in the stage, and to address issues and revise the project plan.
- Electronic Commerce Conference Calls will be conducted with DOE to update field sites and headquarters EC Task Force members of progress.

In the event a problem is encountered within the development of the project, the issue will be reported in a Issue/Resolution Log. This log will consist of the description of the problem, the date the problem was reported, the person who reported the problem, the name of the person responsible for overseeing the resolution of the problem, a detailed explanation for overcoming the issue including the resolution and resolution date.

3.2.1 Status Reporting

As required

In addition to all formally scheduled meetings, informal meetings will occur throughout the entire project on an as-needed basis; that will be determined by either a cognizant EC Task Force Members or the CDSI EC Team.

Weekly

The Project Manager will update the status report on a weekly basis to provide the approvers information about recent completions, accomplishments, and efforts expended. The Project Manager will discuss the progress of the EC-Web project for each scheduled EC Task Force Conference Call meeting between the CDSI EC Team, the system owner, the client representative, and the DOE Field Site Representatives. The CDSI development team will also meet weekly to discuss issues and progress.

In addition to these weekly means of reporting status, the project manager will be available to answer questions about the progress of the application throughout this project.

Monthly

All of the above information will be summarized in the Technical Status Report (TSR). The TSR is the official reporting mechanism for the System Development organization. It will be prepared monthly, and will be distributed according to the standard distribution list and Technical Monitor.

3.2.2 Stage Exits (Project Checkpoints)

Each stage will conclude with a formal checkpoint called a stage exit. When a stage has been successfully “exited," this will indicate that all the deliverables due to date have been completed, all outstanding issues have been addressed.

CDSI proposes that periodic checkpoints be establish to confirm CDSI is complying with the proposed Delivery Schedule approved by DOE. Further, each stage of development will include an In-Stage Assessment conducted by a CDSI Quality Assurance Consultant to verify that all draft and final deliverables due to date have been completed, all outstanding issues have acceptable action plans, and there is a sound plan for the remainder of the project. The checkpoint process will consist of a meeting of CDSI key personnel and designated DOE representatives to present and review the completed

objectives. The project's designated approvers and any affected functional areas involved in the project must provide a written position of concur/non-concur at each stage checkpoint.

The checkpoints and corresponding completion dates are listed as follows.

Checkpoint Date	Description
• May 7:	Exit Planning Stage. Identify selected development environment (web server, database server, and Development tools). Present Project Plan and detailed WBS.
• June 16:	Exit Preparation Stage. Present Concept of Operations with detailed process flow of "how" system will operate. Indicated that all resources are in place to begin application design and development
• June 30:	Prototype Requisition screens and present EC-Web application screen design for DOE field approval.
• July 16:	EC-Web Screen Development completed - Provide demonstration of developed EC-Web screens. Demonstration to be performed at DOE Proc Ops office accessing development environment at Quince Orchard.
• August 5:	Exit Software Design Stage. Marks the completion of applications design and program specifications. Actual coding will begin. This date will signal that all is right on track for EC-Web. A technical design and program specification presentation will made.
• October 12:	Present EC-Web Requisition and Approval Modules.
• October 20:	Demonstrate EC-Web Solicitation, receipt of bids, and bid evaluation processes.
• November 18:	Demonstrate EC-Web system end-to-end small purchase process with a automated financial interface.
• November 28:	Exit Programming and Integration Stage. Present System Documentation
• February 2:	DOE Procurement operations begin live purchasing. Present results of End-to-End Test Plan and present operational system.
• March 16:	Begin expansion of operational mode to additional end-users, field sites, program offices. Exit System Testing and Acceptance Stage.

3.3 Assumptions, Constraints, and Dependencies

End-User Assumptions

It is assumed that each end user is required to have Netscape Navigator 3.0 web browser clients or equivalent to access EC-Web. Further, it is assumed that each end user's client has TCP/IP access to the EC-WEB server. It is also assumed that each end users can print from web browser client.

Gateway Assumptions

It is assumed that the EDI gateway will have TCP/IP access to LLNL EC HUB. LLNL will be available for consultation, if needed, regarding the EDI Gateway program, scripts, translation workbench, and translation engine. Additionally, LLNL will be available to participate in testing the gateway to Hub communications and services.

DISCAS Assumptions

The EC-Web server has Network Virtual Terminal (NVT) access to every DISCAS systems.

Security Assumptions

It is assumed that the EC Security Plan and DISCAS Security Plan will be approved by the DOE Field Sites if adequate risks and specific countermeasures are adequately identified.

Requirement Assumptions

It is assumed that the Functional Requirements Document will be used as the basis for determining how all the end-users expect the system to operate.

Dependencies

This project is dependent upon LLNL supporting DOE, gateway functionality if required, Hub Services as related to the VAN's and DOE's Trading Partners, and LLNL's support of tracking and archiving EDI documents consistent with the SPS-GATEC implementation. The success of this project is dependent upon LLNL's availability to support all migrations from the GATEC-SPS implementation to the EC-Web-GATEC implementation as defined throughout this project. This project is dependent upon the continued successful operation of the LLNL Hub and LLNL's ability to revise VAN agreements representing DOE's business practices. The success of this project is dependent upon hiring the appropriate resources in a timely manner.

3.4 Risk Management

Risk Category: Technological Risk

There is currently no existing Web-based application that has the functionality of the required system. The basic functionality of each piece of this system has been demonstrated in pieces in other systems. The technological risks are associated with integrating the pieces. The Web server must have flexible and controlled access to the database. The Web server/Database/OS must have flexible interaction with

external processes. The Web server OS and EDI Gateway OS must support standards based secure E-mail for message transfer. The Web server OS must support scripted Network Virtual Terminal (NVT) sessions.

Risk Mitigation: Technological

The Web server, Database, and OS will be selected to minimize these risks. The Web server and Database will be evaluated on the ability of the Web server to provide powerful and controlled access to the database. The Web server, Database, and OS will be selected based on their ability to integrate with each other and external programs. Particularly, the OS must support some form of standards based secure SMTP E-mail that is also supported on the EDI Gateway platform.

CDSI maintains a Certified Business Partnership with ORACLE inc. The services available incorporates all aspects of the ORACLE business strategy. Business Re-Engineering, DataBase Designs, Applications Programming, Systems Programming, Network Integration, and Training can be provided for both short and long term projects. CDSI in conjucntion with ORACLE personnel will accomplish the technical solutions necessary in the most demanding environments. As certain situations and requirements arise, CDSI and/or Orcale will provide; on-site, remote, and telephone support may established at any given location, nationwide.

CDSI is an authorized Lotus Notes Reseller in partnership with IBM. Lotus Developers and Consultants are valuble resources to design and implement Lotus Notes installations. CDSI maintains a skilled staff of experience Lotus Notes programmers and designers to accomadate a variety of requirements. This alliance ensures that our clients will received the latest and optimal solutions. This midigates the risk associated with any situations that may occur.

Risk Category: Performance Risk

It is possible that end user response time will be unacceptably slow or that connectivity to either the DISCAS system will be unacceptably slow. This could be due to the EC-Web server being overloaded or network utilization problems within the DOE business network.

Risk Mitigation: Performance

The user application uses the Hyper Text Transfer Protocol (HTTP). The HTTP provides efficient use of network bandwidth. The DOE HQ network is based on 10MB Ethernets connected by high speed back bones. It is not anticipated that this application will create a bandwidth capacity problem within this network.

The remote sites access the HQ DOE network by a variety of WAN technologies and data rates. HTTP is often used over moderate capacity links without performance problems. If a performance problem

exists that is attributed to network utilizations problem of the remote site, increasing that site capacity may be required.

Server load estimates will be made based on current purchasing volume and the estimated DOE users. Hardware will be selected that has demonstrated the capability to handle similar loads in other systems. Hardware will also be selected based on its scaleability.

Risk Category: Staffing

The present vacancies for the position of Lead Software Developer, Senior Programmer, and to mid-level Programmers present a high risk to the project timeline.

Risk Mitigation: Staffing

Presently recruiting and staffing measures are being implemented via headhunters, CDSI in-house Human Resources Department, job recruiting fairs, and newspaper advertisements. Every effort will be made to adequately staff this project with exceptionally qualified resources.

Risk Category: Aggressive Project Timeline

The project timeline is very aggressive and requires coordination between DOE approvers and the DOE field sites.

Risk Mitigation: Aggressive Project Timeline

CDSI providing schedules in advance via the WBS for timeframes, deadlines, deliverable presentations, and meetings. This will provide DOE with a clear understanding of their involvement so that DOE can plan the use of resources to review submitted documentation and deliverables in a timely manner.

3.5 Project Estimates

3.5.1 Size Estimates

Estimates for the EC-Web project were determined by analyzing the project requirements that are known to date. This included the current project objectives and information gathered during the last three years of working on this project and documenting the requirements, concept of operations, integration and interfacing requirements and the cross-reference matrix. Surveys analyzing historical data pertinent to the procurement lifecycle have also been conducted to assist with completing the size estimation: such as number of procurements annually, number of requisitioners, number of buyers, number of credit card users, number of line items per requisition, number of lines per purchase order, and the number of documents needed for one life cycle of a small purchase procurement. Should there be a change in requirements, the size estimates will be revisited and reconsolidated.

3.5.2 Time Estimates

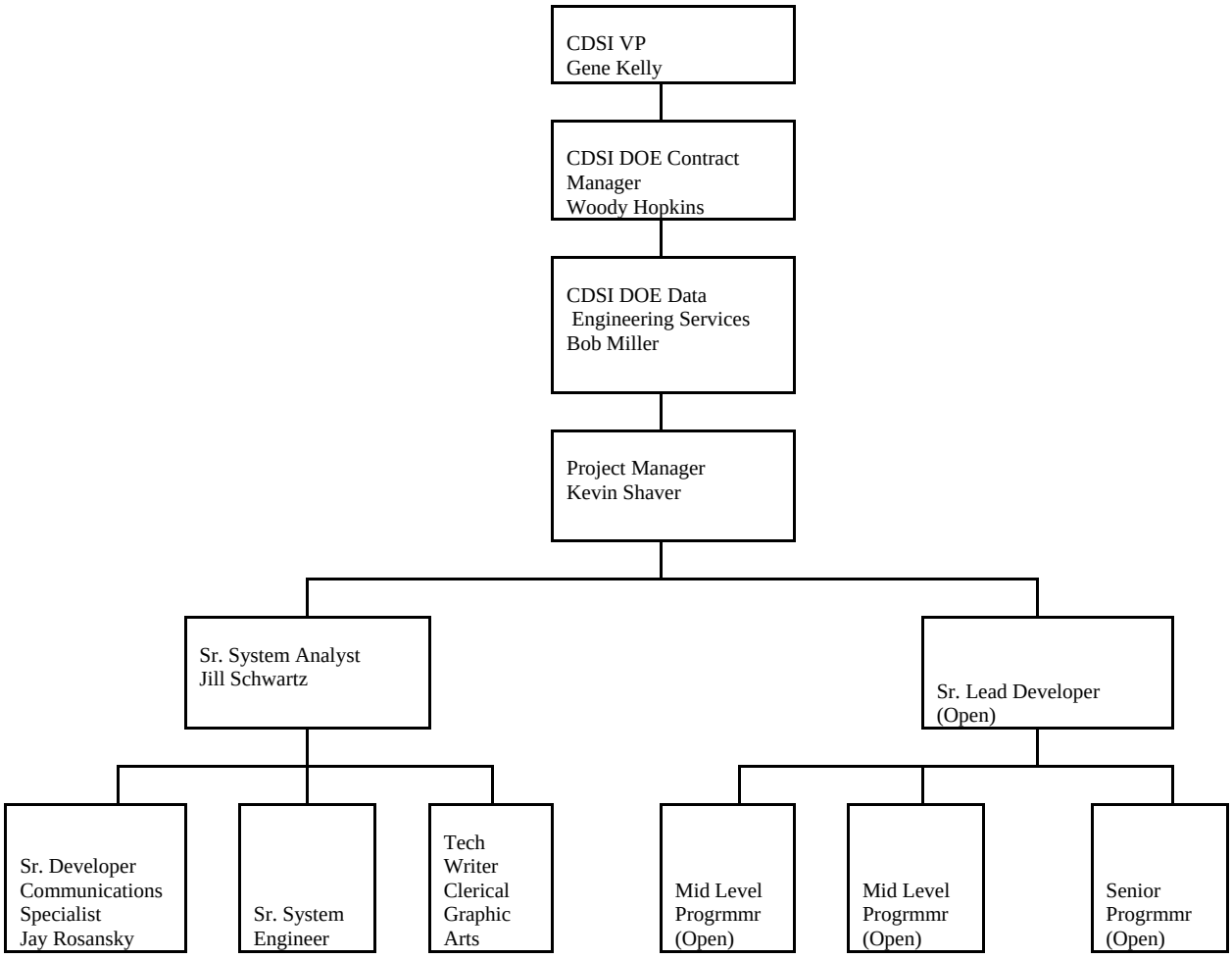
The size estimated was used to project the time required for developing the web-based procurement application, based on skill/experience levels as defined in the Staffing Plan section. They were also provided to the functional areas using the defined functional baseline to support in estimating activities for the project. Specific to the software development, prototypes were configured in the EC Test Bed environment and communicated to experts for additional independent estimates. The resulting resource allocation chart represents a best effort to achieve a combination of optimum resource utilization and early project delivery. At the completion of the Preparation Stage of the project, the estimate of total person hours will be updated and validated against the target completion dates.

3.6 Staffing Plan

Figure 2 depicts the CDSI EC project team staffing profile and hierarchy. The staff will consist of the following positions:

- 1 PTE - Project Manager
- 1 FTE - Senior System Analyst
- 1 FTE - Senior Lead Developer
- 1 FTE - Senior Programmer
- 1 FTE - Senior Developer/Communication Specialist
- 1 PTE - Senior System Engineer
- 2 FTE - Mid-level Programmers
- 1 PTE - Quality Assurance Consultant
- Matrix of Trainer, Tech Writer, Clerical, Graphics Artist

Figure 2. CDSI EC Project Team Organization Chart



3.6.1 Required Skills

The **Project Manager PTE,** Kevin Shaver, will provide overall technical expertise for the project and act as liaison to DOE Management/CDSI Management. Further responsibilities will include providing e-mail subject matter expertise, cost containment and management/accountability of budgeted project dollars, project staffing, and hardware/software procurement. He will be the key resource for overseeing the day-to-day system development, and tracking software development progress via Cross-Reference Matrixes. Further responsibilities will include participation in the analysis and selection of development environment, security, and will be participating in system design issues and decisions, and EDI-compliance of EC-Web. The **Project Manager/Planner** must be capable of developing a project plan using a bottoms-up approach. This person must be able to coordinate the activities of several persons who will provide the WBS detail, project estimates, and dependencies. This person must be able to work closely with the system owner on resolving issues and concerns across organizations.

The **Senior Systems Analyst FTE**, Jill Schwartz must be capable of interviewing end-users, capturing user wants and needs and translating them into system requirements. This person must also be able to perform an analysis of the requirements and develop a conceptual system architecture.

The **Senior Lead Developer** must be able to produce the Design Specification document and program an application based on the Requirements Specification document and the Design document. This position needs very little supervision. The Designer/Programmer is responsible for delegating program assignments to the Programmer.

The **Programmers** must be able to program and unit test specific modules of an application and using the Design Specification document. This position needs to take direction from the Designer/Programmer.

The **Independent Tester** must be able to review the Requirements Specification document and the Design document to determine testability of functions described therein. The Tester must be able to design and execute a System Test and Acceptance Plan based on the Requirements Specification document. This position will work independently from the development team to ensure an objective review of the products as they are being delivered.

The **LAN Engineer, PTE,** John Li, must be able to document requirements for the system to be installed on the PR LAN, install the application, and write and execute a test plan that will determine adherence to LAN response time standards for the HRIS system.

The **Documentation Specialist** must be able to write the EC-Web User Manual in a Windows-based word processing package. This person must be able to execute the application in order to capture screens for placement into the manual. The Documentation Specialist must be able to create the EC-Web User Manual with little supervision from the Project Manager/Analyst.

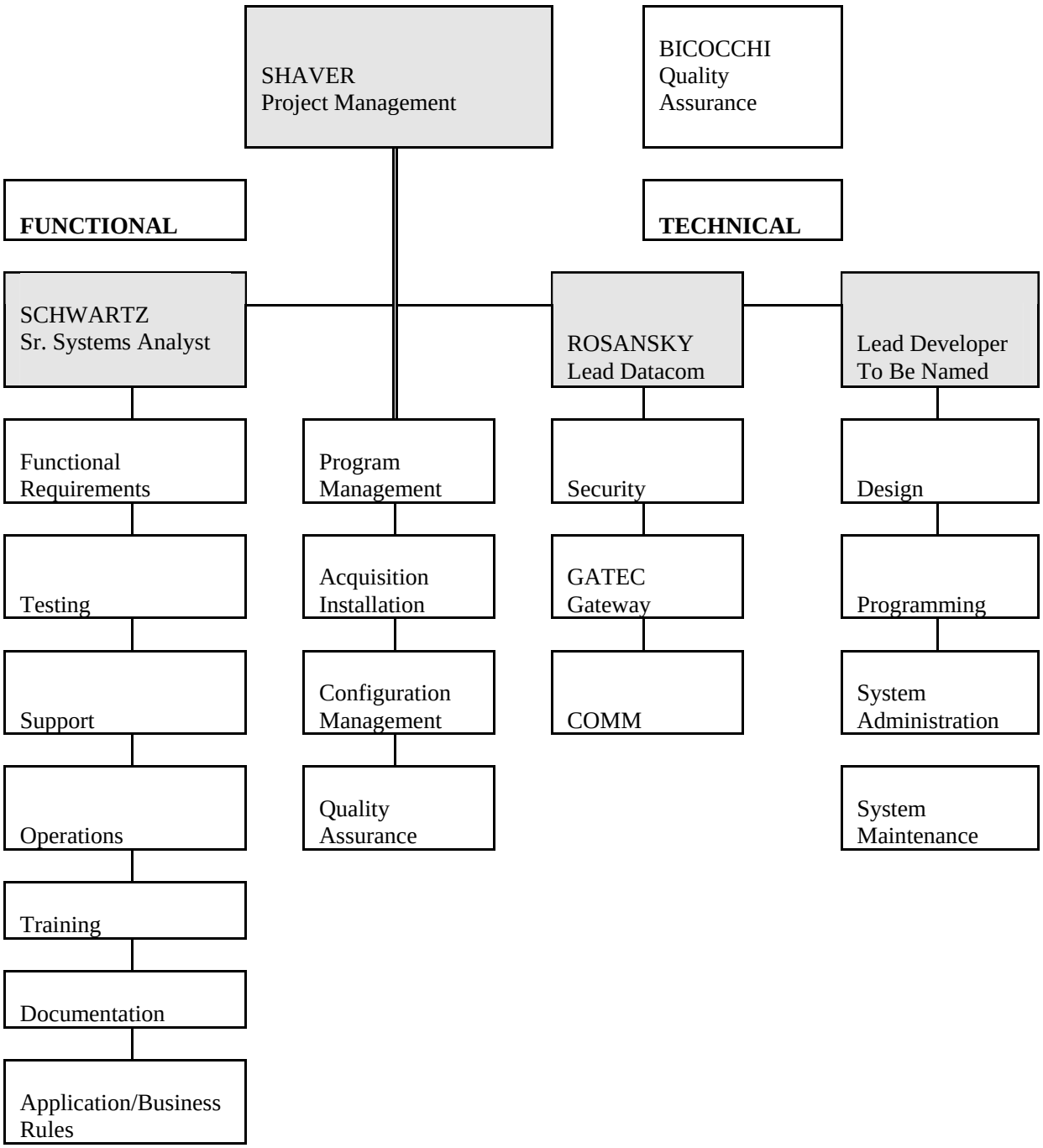
The **Trainer** must be able, based on knowledge gained in the study of the EC-Web User Manual, to prepare and execute a Training Plan for approximately twenty users of the EC-Web application. The Trainer will be assisted by the development team as needed.

The **Configuration Manager,PTE,** Kevin Shaver, must be able to write a Configuration Management Plan (CMP) that identifies the project items that will be placed under formal change management and the method by which change against these items will be managed. This person must also be able to execute the CMP, managing all changes from the Design through Installation stages.

The **Acceptance Tester**, Ellen Colligan, must test the application separately from the development team, as an advisor to the client. This person must utilize the EC-Web User Manual to determine if *all the processes* in the application are functioning correctly according to that manual, and principles of user friendliness. This person will perform his or her duties with very little assistance from the development team in order to maintain objectivity.
The following chart depicts the roles and responsibilities of the present CDSI EC team from a functional and technical perspective.

An additional chart will be developed that will merge the DOE and CDSI project organizational hierarchy into one flow chart and depict the roles and responsibilities for DOE and CDSI.

Figure 3. CDSI EC Project Team Functional Responsibilties



3.6.2 Resource Loading Chart

A Resource Loading Chart will be submitted as part of the formal response to the task assignment modification. This will be supplied in the form of the CDSI Resource Planning Elements (RPE) system.

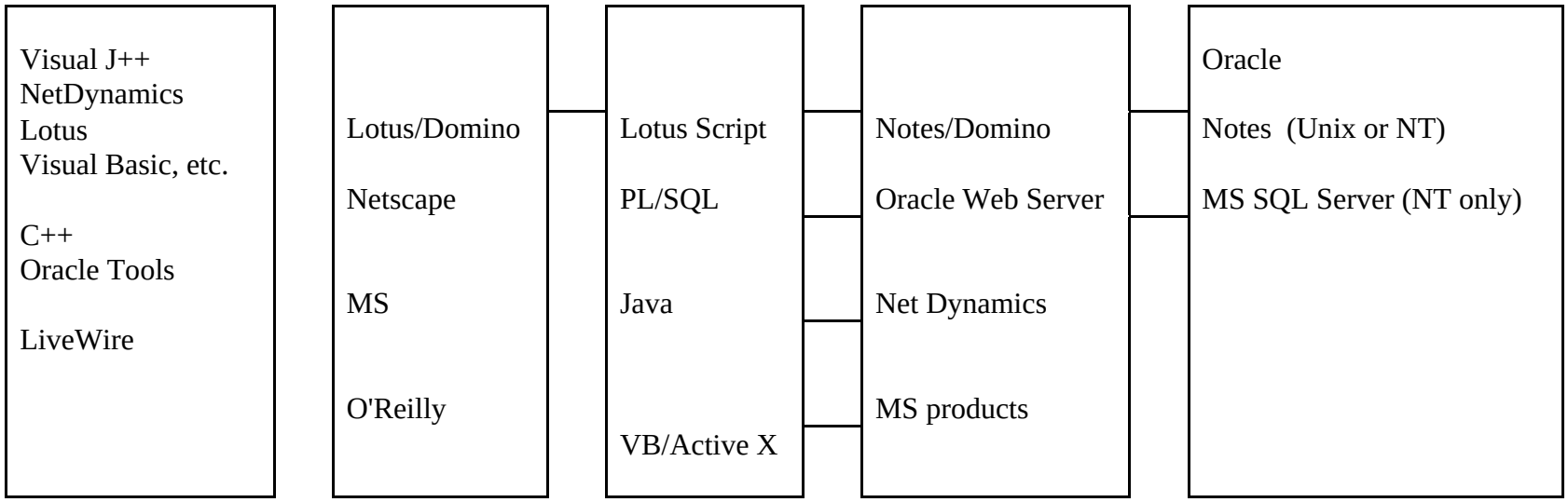
3.7 Master Schedule/Project Deliverables

Stage of Development SYSTEM DEVELOPMENT PHASE	Stage Completion Date	Deliverable	Deliverable Completion Date
		Proposal	02/01/97
		EC-Web Project Plan	02/24/97
		In-Progress Review (CDSI)	02/26/97
		WBS	03/01/97
		Quality Assurance Plan	03/01/97
		In Stage Assessment (QA)	03/03/97
PLANNING STAGE	05/07/97	Exit Planning Stage (DOE)	05/07/97
		Select Development Environment	03/07/97
		Acquisition and Installation Plan	03/17/97
		Functional Requirements Doc.	05/15/97
		Concept of Operations	06/09/97
		Configuration Mgmt Strategy	05/16/97
		In Stage Assessment (QA)	06/10/97
PREPARATION STAGE		In-Progress Review (CDSI)	06/13/97
	06/14/97	Exit Preparation Stage (DOE)	06/16/97
		Design Entities/Dependencies	07/01/97
		Logical Model	07/01/97
		Table Structures	07/01/97
		Database Schema	07/01/97
		Functional Design Document	07/15/97
		Screen Designs & Demonstration	07/16/97
		Cross Reference Matrix	07/15/97
		In-Progress Review (CDSI)	07/31/97
		DISCAS Security Plan	07/31/97
		EC-Web Security Plan	07/21/97
		Training Plan	07/31/97
		System Test/Acceptance Plan	07/31/97
		Conversion Plan	07/31/97
		Programming Specifications	08/04/97
SOFTWARE DESIGN		In-Stage Assessment (QA)	08/04/97
STAGE	08/05/97	Exit Software Design Stage (DOE)	08/05/97

Stage of Development SYSTEM DEVELOPMENT PHASE	Stage Completion Date	Deliverable	Deliverable Completion Date
		Site Installation Plan	09/30/97
		In-Progress Review (CDSI)	10/20/97
		Mappings	11/15/97
		Software	11/18/97
		System Documentation (draft)	11/18/97
PROGRAMMING AND INTEGRATION STAGE	11/30/97	In-Stage Assessment (QA)	11/21/97
		Exit Programming/Integration Stage	11/28/97
		Test Results	02/02/98
		Operational System	02/03/98
		In-Stage Assessment (QA)	02/16/98
		System Documentation (final)	02/27/98
SYSTEM TESTING AND ACCEPTANCE STAGE	03/15/98	In-Progress Review (CDSI)	03/02/98
		Exit Testing/Acceptance Stage (DOE)	03/16/98
Exit Phase	03/30/98		

4. TECHNICAL APPROACH

In anticipation of this effort and in response to DOE direction, CDSI has begun analyzing EC-Web development technologies and services. To date, the CDSI EC Team has conducted a market analysis including identifying different products, tools, modules, and interfaces that are either sold as custom off-the-shelf (COTs) applications, plug-ins, separate modules, development tools, or a complete suite of integrated products. The table shown on the following page identifies the various products, tools, models, and interfaces that are being considered for use in the development of the EC system.


Visual J++
NetDynamics
Lotus
Visual Basic, etc.
C++
Oracle Tools
LiveWire
Lotus/Domino
Netscape
MS
O'Reilly
Lotus Script
PL/SQL
Java
VB/Active X
Notes/Domino
Oracle Web Server
Net Dynamics
MS products
Oracle
Notes (Unix or NT)
MS SQL Server (NT only)
Development Tools
Web Server
Application
Middleware
DBMS (HW/OS)

In the preparation phase, three development platforms illustrated above are assembled and are evaluated while recruiting activities being put in place to staff this project. Specifically, the development environment will be defined, configured, and documented in a Concept of Operations document to be reviewed and approved by DOE. The analysis will be conducted by installing each option in a test-bed environment and performed hands-on analysis. To prepare for this analysis, CDSI has obtained evaluation copies of the identified software suites and using the DOE HQ SPS implementation hardware to configure the development environment. This includes Pentium development work stations, the Compaq Proliant database server, and the Compaq Pro Signia file server. The SPS configuration includes Windows NT and SCO Unix operating system as well as Oracle RDBMS v7.x and user licenses.

Although it has been determined that the SPS hardware configuration will meet the requirements for the development environment platforms, it is anticipated that there will be additional costs associated with assembling the development environment. A Acquisition and Installation Strategy will be presented listing the projects hardware and software cost associations as well as detailing a plan for installing and configuring the development environment.

Once the preparation phase has been completed, the CDSI team will be prepared to move into the remaining phases. The design, development, and testing phases will proceed as defined. However, the deployment phase, including training, support, and vendor outreach are specific to the DOE Headquarters Procurement Operation Division. Once the Division is on-line, the DOE EC program leadership will need to determine further deployment and training schedules.

4.1 Programming Languages

Several options are being explored for the proposed programming language for the development of EC-Web: Lotus Notes 4.5 and Domino, Lotus Script, C, C++, and Java. In addition to the programming language options, Lotus Notes also provides several templates that can be modified for various applications. The programming tools incorporated in the features available within the Notes and Domino suites may be suitable for forms creation. The object oriented software development tools within Notes and Domino can also be utilized. The routing requirements of EC can be accomplished by utilizing the Workflow applications within Notes. Domino can provide the Web Development tools to create and customize the WWW interfaces necessary for EC. Intranet development and integration can also be accomplished by the Domino development tools. Domino applications can be accessed directly by any standard WWW browser. CGI-BIN scripting will accommodate the unique requirements that may occur between the data base and external systems.

Another option is Oracle EC and Webserver which is the Oracle suite consisting of Oracle Workflow, Oracle WebServer and additional modules that complement the main suite of applications. Oracle provides templates that may be modified and customized for particular requirements. Oracle Developer 2000 incorporates utilities and tools to program complex SQL statements with the assistance of simple GUI interfaces. The new 5GL programming toolkits are integrated within the Oracle suite of applications. Oracle Webserver provides the development facilities to design and create large complex

data bases integrated to WWW. Intranet development and integration will be accomplished by implementing the HTML and Java design tools.

4.2 Security

Security is a critical component of conducting Electronic Commerce effectively. Several measures will be implemented to protect the integrity of the DOE EC System, the EC-Web procurement application, and the financial system, DISCAS.

Separate security plans identifying risks associated with the system and detailed countermeasures that will be in place to minimize security risk will be documented in the EC Security Plan and the DISCAS Security Plan.

Both Security Plans should be acknowledged and approved by the DOE Headquarters and Field Sites before implementation of the EC system.

4.3 Hardware/Software Requirements

Specific hardware/software requirements will be finalized in the Preparation Stage, upon the completion of defining the software development environment. Each end user is required to have a Netscape browser or equivalent, that will be necessary for accessing EC-Web. Hardware/software requirements will be detailed in the Acquisition and Installation Plan.

4.4 Configuration Management

Software Configuration Management activities will begin within the Software Design Stage and continue throughout the System Enhancement Stage that will occur when the system is operational. All CM activities will commence upon the approval of the Functional Requirements Document scheduled for preparation and approved within the Preparation Stage by April 7, 1997. The Software Configuration Management Guide (SCMG) will be used as a guide for managing the software product life cycle for this project. The following CM activities will have procedures in place for each stage of this project:

- Identification of software configuration items
- Change control procedures for software configuration items
- Auditing
- Status Accounting

4.5 Change Control Process

A Configuration Management Plan (CMP) will be developed to control changes directly affecting the procurement application software and documentation during the initiation, development, and operation

phases of the EC system. Every effort will be made to ensure that changes will not compromise the data or system integrity.

The Functional Requirements Document and System Design Document will be used as tools to baseline the system. All future changes and modifications requiring further development that may change the baseline will be changed only via the formal change control procedures established.

A Change Control Board (CCB) will be formed and will evaluate and approve proposed engineering changes and ensure the implementation of the approved changes.

Any requirements added after the Preparation and Design Stage will require mutual agreement on the part of the CCB and any respective approvers. Any impact on the scheduled deliverable dates will be addressed prior to incorporating the change. Change initiation, logging, evaluation, and approval procedures will be detailed in the CMP.

Ellen Colligan, POC	The person authorized to request modifications/additions to the baseline requirements.
Kevin Shaver, Project Manager	The person that will receive modification requests and coordinate a project-wide impact assessment for determining the scope of effort and time estimate for implementing change.
Steve Mournighan, System Owner	The person authorized to review modification requests and the impact assessment, and approve or disapprove the implementation.

All approved changes and their impact on the project schedule and budget will be reviewed at each Stage Exit and the Project Plan will be adjusted accordingly.

4.6 Testing Strategy

Because of the intricate interfaces and components of the entire EC system, a detailed Test Plan will be used for verifying the accuracy of data and flow of documents throughout the system. The System Testing and Acceptance Stage will be used to execute the Test Plan that will incorporate the following activities:

- Component Testing
- Integration Testing
- System Testing
- Acceptance Testing

The Test Plan will be produced in the early part of the Programming and Integration Stage. Component and integration testing will be included in the programmer's individual work plans.

System testing will include testing for functionality and operation of the system in its intended production environment. 'Live Buys' will be issued as a measurement of success for the system test.

The System Test Plan will include the generation and execution of test case scenarios, mappings to ANSI X12 requirements, and tracking and reporting of defects. Acceptance testing will include testing of end-user functionality. Acceptance testing conducted on the operational system will determine if the system is acceptable by DOE.

4.7 Quality Assurance

Quality Assurance for this project will include an In-Stage Assessment (ISA) conducted near the end of each stage of development. The ISA is the DOE standard to assure that the established system development and project management processes and procedures are being followed effectively, and exposures and risks to the current plan are identified and addressed.

The Quality Assurance Consultant, Andy Bicocchi will provide quality assurance support throughout the duration of the project. Andy will provide a position at each stage exit based upon his ongoing involvement in the project.

A Software Quality Assurance Plan (SQAP) will be delivered in the Planning Stage of this project and will provide a foundation for managing the software quality assurance activities for the System Development Phase.

This position will work independently from the development team to ensure objective audits of the work products as they are being developed and objective reviews of project management processes and stage checkpoints.

This Software Development Plan will be used as a guide by the Quality Assurance Consultant. Quality Assurance for EC-Web will include audits for quality and validity of current draft deliverables and selected work products within each stage of development. Each In-Stage assessment will be documented and associated with a risk category of low, medium, or high, on the project schedule, determined by the Quality Assurance Consultant. Issues will be documented in an In-Phase Review Report, that will be used to track pending and resolved issues or concerns.

4.8 Defect Prevention

In addition to removing defects from program code and system documentation during the various levels of testing, several steps will be taken at every stage of development to prevent defects from being introduced in the first place. These steps will include:

- Document deliverables: All documents will be subjected to peer reviews by the CDSI EC Team to help ensure both completeness and accuracy of technical content. In addition, document drafts will be provided to DOE for review and comment as soon as practical, to allow for early feedback.

- Program code: All program modules will be subjected to Structured Walkthroughs and/or code inspections to help remove design and coding defects before test execution.

- Project plans: All project plans will undergo peer reviews and/or Structured Walkthroughs to help ensure all project activities have been accounted for, and to promote early alignment with other persons or organizations upon whom this project has a dependency.

- Test cases: All test cases will be inspected by the EC Test Team to help ensure they are measurable, complete, and appropriate for the function or system scenario to be tested.

4.9 Training

A formal training structure will be developed combining classroom style training, independent end-user training via manuals and on-line help, and train-the-trainer programs. Several topics will be covered within the training program; including EC-Web training, Electronic Commerce training, and overview for EDI. Each training class will have documentation and instructions guiding end-users where to obtain additional information as needed.

System Administration Training will also be conducted for each field sites system administrator. It is envisioned that a separate training class will be held based upon roles and responsibilities within the procurement application. For example, Requisitioners will have different training classes than Funding Managers.

4.10 Documentation

The traditional system documentation as prescribed by the SEM is planned to be produced for this project. Planned documentation includes:

- User's Guide
- Programmer’s Reference Manual
- System Administration Manual
- Database Administration Manual
- Operations and Support Manual

Refer to the Master Schedule/Project Deliverables for additional documentation that is planned for this project.