

PROJECT PLAN

Incident Command Information Tool (ICIT) to Protect Drinking Water

CDRL A002

Contract N41756-03-C-4115

Submitted to:

Combating Terrorism Technology Support Office (CTTSO)

Technical Support Working Group (TSWG)

Submitted by:

Science Applications International Corporation

Hazard Assessment and Simulation Division

1410 Spring Hill Road

McLean, Virginia 22102

August 18, 2002

Project Plan

PURPOSE

The purpose of this project is to develop an Incident Command Tool (ICIT) that enables decision makers to evaluate and take actions against terrorism attacks on public drinking water sources in real time. This tool will integrate multiple sources of information to give decision makers concise summaries of current conditions and forecasts of future consequences of terrorist acts on public water supply safety. The system will be GIS-based. Operate on the COBRA platform and the output will be compatible with the Defense Threat Reduction Agency's (DTRA) Consequences Assessment Tool Set (CATS), the Federal Emergency Management Agency's HAZUS system, and the Environmental Protection Agency's Situation Room.

The development of the ICIT will take place in three phases: requirements, pilot and operational. In addition to these phases, project management tasks will take place during the entire 24-month period of performance. The tasks and deliverables associated with each phase are described below.

PROJECT MANAGEMENT

Dr. William Samuels will serve as Principal Investigator and be responsible for the successful completion of the ICIT project. In addition to providing technical and managerial leadership to the team of developers, Dr. Samuels will prepare monthly status reports and provide meeting support, as required by the government Project Manager, throughout the 24-month period of performance.

Prepare Monthly Status Reports

Monthly status reports (CDRL A003) will be prepared in accordance with the TSWG format. These reports will include a listing of present (current month), planned (next month) activities, deliverable schedule, and project financial information (current and cumulative costs.)

Provide Meeting Support

SAIC project personnel, as directed by the government, will attend meetings and management reviews to support the development of the ICIT. As directed, SAIC will support the TSWG Annual Program Review and Infrastructure Protection Subgroup meetings by preparing presentation material relating to program status, accomplishments, issues, and deliverables. Additional activities will include the preparation of electronic viewgraphs that describe the program, and the preparation and submission of meeting agendas, handouts, presentations, and minutes in support of meetings, conferences, symposia, and demonstrations held in support of this effort (CDRL A005). SAIC believes it to be in the best interests of the Project for the Principal Investigator and the government Project Manager to pursue opportunities for publishing this work, and presenting it at appropriate technical meetings.

REQUIREMENTS PHASE

The purpose of the requirements phase is to identify user needs, translate these needs into a system specification, and develop a project implementation plan for building the ICIT. This phase of this project is partitioned into five sub-tasks as described below.

Conduct Kickoff Meeting

The first task to be performed is to conduct a project kickoff meeting. This meeting will be held within 45 days of project award. The SAIC development team will meet with the government Program Manager, Project Manager and other government agency representatives to review the statement of work, project schedule and list of deliverables. In addition, initial planning for the Requirements Review will take place.

Conduct User Requirements Analysis Review

SAIC will conduct a Requirements Review meeting with the Project Manager and a representative sample of the user community. The Project Manager will provide the user representatives for this meeting. The purpose of the Requirements Review is to ensure that the SAIC development team and the users have a common vision of the proposed outcome of the effort in terms of capability and usability. The Requirements Review is a critical step,

and will be reflected in the Work Breakdown Structure (WBS) and the Project Plan (CDRL A002) as a major milestone.

Development Software Requirements Specification

Subsequent to the Requirements Review, SAIC will conduct a detailed software requirements identification process to ensure accurate capture of the needs of the users. SAIC will research, identify, and document all functional requirements for the ICIT. The deliverable for this sub-task will be a Software Requirements Specification (SRS) document (CDRL A001).

Develop Project Implementation Plan

SAIC will prepare a project implementation plan (CDRL A002) for this effort that will include the purpose of the effort, a description of each task, list of resources required, detailed schedule (WBS), and budget. A Gantt chart will be prepared to include all deliverables, interim milestones, and any external dependencies. As stated previously, the initial project plan will be presented at the kick-off meeting. The project plan will be updated as needed, and all updates will be provided to the government electronically with the monthly status report (CDRL A003).

Conduct Preliminary and Critical Design Reviews

SAIC will conduct a preliminary and critical design reviews for the application prior to commencing development. The design reviews will be reflected on the WBS and in the Project Plan as major milestones. The preliminary software design description (SDD) (CDRL A004) will provide the basis for the preliminary design review. The final draft of the SDD will provide the basis for the critical design review. SAIC will document the design reviews in meeting minutes (CDRL A005).

Pilot Phase

The purpose of the pilot phase is to develop initial and final prototypes (Alpha and Beta systems) based on the software requirements specification. In this phase, SAIC will design, develop, and test a prototype ICIT for the

United States. SAIC will ensure the application meets the user requirements for an incident command tool. The project implementation will serve as the “road map” for achieving this goal. This phase of this project is partitioned into eleven sub-tasks as described below.

Integrate Existing Components and Databases

In this sub-task, SAIC will integrate the RiverSpill watershed and river-reach model as part of the ICIT. The RiverSpill tool will be modified to operate at the highest resolution stream network available through the United States Geological Survey (USGS) National Hydrography Dataset (NHD).

Provide Compatibility with CATS, HAZUS, Situation Room

As previously stated in sections 2.1.1.1 through 2.1.1.3, SAIC will develop the ICIT to be compatible with the DTRA CATS system, Environmental Protection Agency’s Situation Room, and the FEMA HAZUS system. The SAIC development team will meet with representatives from DTRA, EPA and FEMA to ensure that the software requirement specifications explicitly address the compatibility issues with these systems. Specific issues to be addressed are: data structure, file format, output coordinates and units, cross-platform compatibility, and network security.

Develop Interfaces with Sensors, Reports and Hospital Admissions (optional)

SAIC will incorporate the following interfaces in the ICIT: an interface between field sensors and the RiverSpill tool and an interface for input of field reports by first responders and mobile units. The specifications for these interfaces will be determined during the requirements analysis by meeting with government researchers, first responders and instrument vendors. These specifications will be documented in the Software Requirements Specification.

The option to include an interface for the inclusion of hospital admissions data will be carried out by interacting with the development teams working on the BDI and LEADERS program.

Integrate GIS Layers and Databases to Display Water Threats

SAIC will incorporate the following databases into the application: surface water contamination sensor locations; sensor outputs; the location of dams, reservoirs, and locks; the location of surface water bodies; all public drinking water intakes; roads and other terrestrial transportation networks; topography; and population. These databases will be provided as Government Furnished Information (GFI) in GIS compatible format.

Provide Secure Web-based Access

The ICIT will be developed as a web-based application according to the system architecture diagram shown in Exhibit 1. Secure access to the system will be achieved by developing an initial login screen that will prompt for a user ID and password. A system administrator function will be developed for issuing, modifying and revoking user IDs and passwords. The web-mapping component of the system will be developed using the ESRI ARCIMS software. The current RiverSpill capability to access USGS real-time stream flow data over the Internet will be incorporated into the system. To the maximum extent possible, the ICIT will access other Internet accessible water quality sensors and instruments.

Track Pathogens, Chemicals and Radioactive Substances

SAIC will ensure that the application is capable of tracking human pathogens, toxic chemicals, and radioactive substances that pose significant threat to public safety if they were used to attack water sources. This will be accomplished by expanding the Constituents of Concern database accessible in RiverSpill to include any missing pathogens or chemicals and to add in radioactive substances. The Constituents of Concern database will be presented to the user community during the requirements phase for review and comment. SAIC will incorporate all Project Manager approved comments to update the database.

Conduct Test Readiness Reviews

SAIC will conduct Test Readiness Reviews (TRR) prior to Alpha testing. These TRRs are to demonstrate suitability of the application to undergo testing and get government approval of the test plans. The TRR will

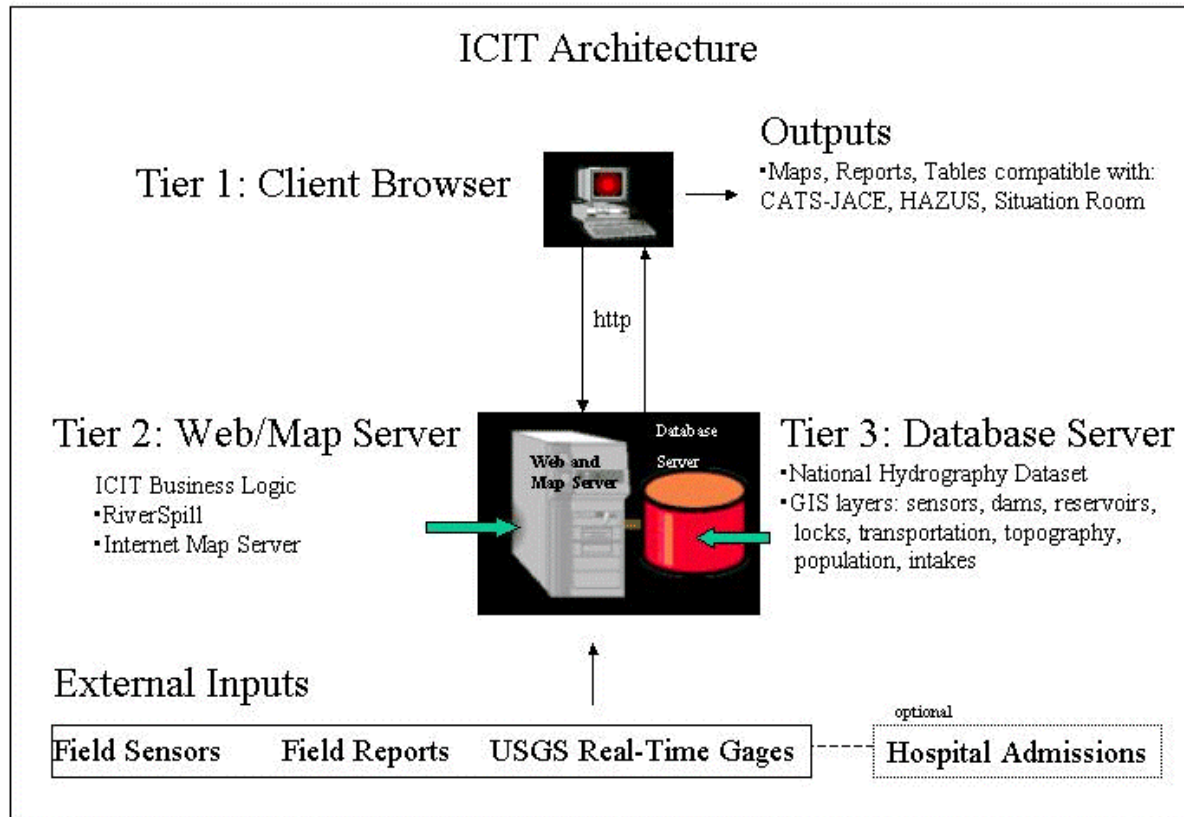


Exhibit 1. Incident Command Information Tool Architecture

result in signed documentation by the Project Manager, government representative, and contractor representative verifying the applications suitability to undergo testing.

Conduct Training Prior to Alpha Testing

SAIC will provide training to user personnel prior to Alpha testing to familiarize them with the application. The government Project Manager will approve the schedule, location, and number of users to receive training.

Prepare Alpha System Test Plan

SAIC will prepare a test plan (CDRL A006a) for the Alpha test that includes all procedures for testing; the performance of the application; the performance of the associated databases; the evaluation criteria; test report formats; and expected duration of each test. As part of the test plan, SAIC will develop test condition responses for all software functional requirements, and shall provide these to the Project Manager and the CTTSO/TSWG Program Manager for review.

Conduct Alpha System Test

SAIC will conduct an Alpha [Systems] test for all components of the application. SAIC will ensure the Alpha test encompasses all intended functionality of the application. SAIC will act in consultation with the Project Manager to ensure the Alpha test participants are representative of the user community.

Prepare Alpha System Test Report

SAIC will prepare an Alpha test report at the conclusion of system testing (CDRL A007). As a condition for transition to the Operational Phase, the ICIT must pass Alpha system testing prior to Beta testing. Criteria for passing Alpha system testing will be approved by the government Project Manager.

OPERATIONAL PHASE

The purpose of the operational phase is to convert the final (Beta) prototype into an operational system. In this phase, SAIC will conduct Beta system testing, system administration and configuration management functions. A technology transition plan and final report will also be prepared. This phase of the project is partitioned into ten sub-tasks as described below.

Conduct Test Readiness Reviews

SAIC will conduct Test Readiness Reviews (TRR) prior to Beta testing. These TRRs are to demonstrate suitability of the application to undergo testing and get government approval of the test plans. The TRR will result in signed documentation by the Project Manager, government representative, and contractor representative verifying the applications suitability to undergo Beta testing.

Develop Beta Test Plan

SAIC will develop a Beta test plan (CDRL A006) for approval by the government that includes the duration of the test, number of test to be conducted, procedures for testing, the performance of the application, the performance of the associated databases, the evaluation criteria, and test feedback mechanism/report formats.

Develop User's Manual

SAIC will prepare a draft user's manual in both hardcopy and softcopy format (CDRL A008) for use during the Beta testing.

Conduct Operational Demonstration and Training

SAIC will coordinate and conduct an operational demonstration and training session to selected user population prior to commencing Beta testing. The government Project Manager will approve the schedule, location, and number of users to receive the demonstration and training.

Conduct Beta System Test

SAIC will conduct an operational [Beta] test of the application. The Project Manager will identify and obtain the cooperation of the user test population.

Prepare Beta System Test Report

SAIC will prepare a Beta test report at the conclusion of testing (CDRL A007). SAIC will plan for the collection of user feedback and resolution of software defects.

Perform System Administration Functions

SAIC will perform systems administration activities on minicomputer systems and networks necessary for development and testing of the Incident Command Tool. System administration will include: installation of all components of the application, system configuration, problem isolation and resolution, file and data archival, user administration, file system maintenance, software and data security, and data transfer and conversion.

Perform Configuration Management Functions

SAIC will obtain the approval of the Project Manager for all changes in requirements. SAIC will provide configuration management throughout the application development, testing, and technology transition.

Develop Technology Transition Plan

SAIC will develop a Software Technology Transition Plan (CDRL A009) addressing all elements to be considered in transitioning the technology to the intended users. The transition plan will include information on the management of intellectual property if any, and an assessment of regulatory, security, export control, and liability information. The transition plan will also include a strategy for lifecycle maintenance and upgrade of both the application and associated databases.

Prepare Final Report

SAIC will prepare a final report (CDRL A010) documenting the development in its entirety. The final report will include the purpose, technical approach, and result of the development. The final report will discuss the transition of the technology to the user group and any recommended enhancements to the technology not covered by this effort.

PROGRAM PLAN

Facilities and Equipment

This project will be performed at SAIC's facilities in McLean, Virginia. The Development Team, mentioned below, are all members of the Hazard Assessment and Simulation Division. This SAIC Division contains a modern computer lab for software development. The lab is equipped with Windows 2000 Servers, Desktop and Laptop Computers, Color and Black/White Printers, CD-ROM writer, Color Scanner, and software development tools such as MS Visual Studio, Visio, Java, and Web Authoring Tools (Dreamweaver, Front Page). SAIC is an ESRI business partner and as such, access to the full suite of ESRI GIS software is available. This includes: Arcview 3.x (including all extensions), ARCINFO 8.x, ARCIMS, SDE, and MapObjects. Relational database management systems include SQL Server and ORACLE. The full suite of MS Office tools are also available. A high speed Internet (T1) connection is maintained through the SAIC network. Network security is maintained through firewall administration. Two computers are also cleared for classified processing.

Documents

Relevant documents for this project include:

- RiverSpill Users Guide, SAIC 2001
- PipelineNet Users Guide, SAIC 2001
- CATS-JACE Users Guide, SAIC 2001
- ESRI 2001 Conference Publication, Using Network Analyst to Calculate Pollutant Travel Times, Proceedings 21st Annual ESRI User Conference, July 9-13, 2001, San Diego, CA

- ESRI 2001 Conference Publication, A GIS-based Water Distribution System for Salt Lake City, UT, Proceedings 21st Annual ESRI User Conference, July 9-13, 2001, San Diego, CA.
- Watershed 2002 Conference Proceedings, RiverSpill: A GIS-Based Real Time Transport Model for Source Water Protection, Watershed 2002, February 24-27, 2002, Ft. Lauderdale, FL

Project Team

The content and structure of the proposed ICIT Project team is shown in Exhibit 2. The Principal Investigator and Government Project Manager interact directly as do the two contracting officers. The lines of communication for all supporting services and groups are unambiguous. SAIC has assigned Dr. Joseph McGahan, Manager of the Hazard Assessment and Simulation Division, sole responsibility for resolving issues with the CTTSO/TSWG Program Manager, should that become necessary or advantageous.

Dr. William Samuels will be the Principal Investigator for this project. He has 25 years experience developing and implementing GIS and modeling applications to environmental issues and emergency response. Dr. Samuels was the principal investigator for both the TSWG RiverSpill/PipelineNet applications and critical infrastructure database catalog project. He will be the primary point of contact for the Government Project Manager. He will be responsible for overseeing all technical tasks and ensuring that the schedule and deliverables are met. Dr. Samuels will receive bi-weekly project cost status reports from SAIC's financial tracking system. This information will be used to monitor the spend rate and to ensure that the project stays within budget. Dr. Samuels will report any issues of concern immediately to the Government Project Manager so that a plan for resolving the issue can be formulated. Dr. Samuels will oversee two development teams in this effort: Science and Engineering; and GIS and Software.

The Science and Engineering Team will consist of Dr. Rakesh Bahadur and Dr. David Amstutz. Dr. Bahadur will be the lead engineer on the project He has Ph.D. in Civil Engineering and has 20 years experience in all aspects of the water sector. Dr. Bahadur was the lead engineer for the RiverSpill and PipelineNet models. Dr. Bahadur's primary responsibility will be to ensure the validation and verification of all model inputs, equations

and results. Dr. Amstutz, a senior scientist at SAIC, will provide assistance to Dr. Bahadur in the areas of open channel flow, river modeling, model validation and skill assessment.

The GIS and Software Team will consist of Mr. Jonathan Pickus, Mr. Michael Monteith, Ms. Kathi Parker and Mr. Chris Ziemniak. Mr. Pickus will be the lead GIS analyst for the project. He was the lead GIS programmer for the RiverSpill and PipelineNet models. Mr. Monteith and Ms. Kathi Parker will be the lead software engineers. Mr. Ziemniak will be the system administrator for this project. All team members hold security clearances.

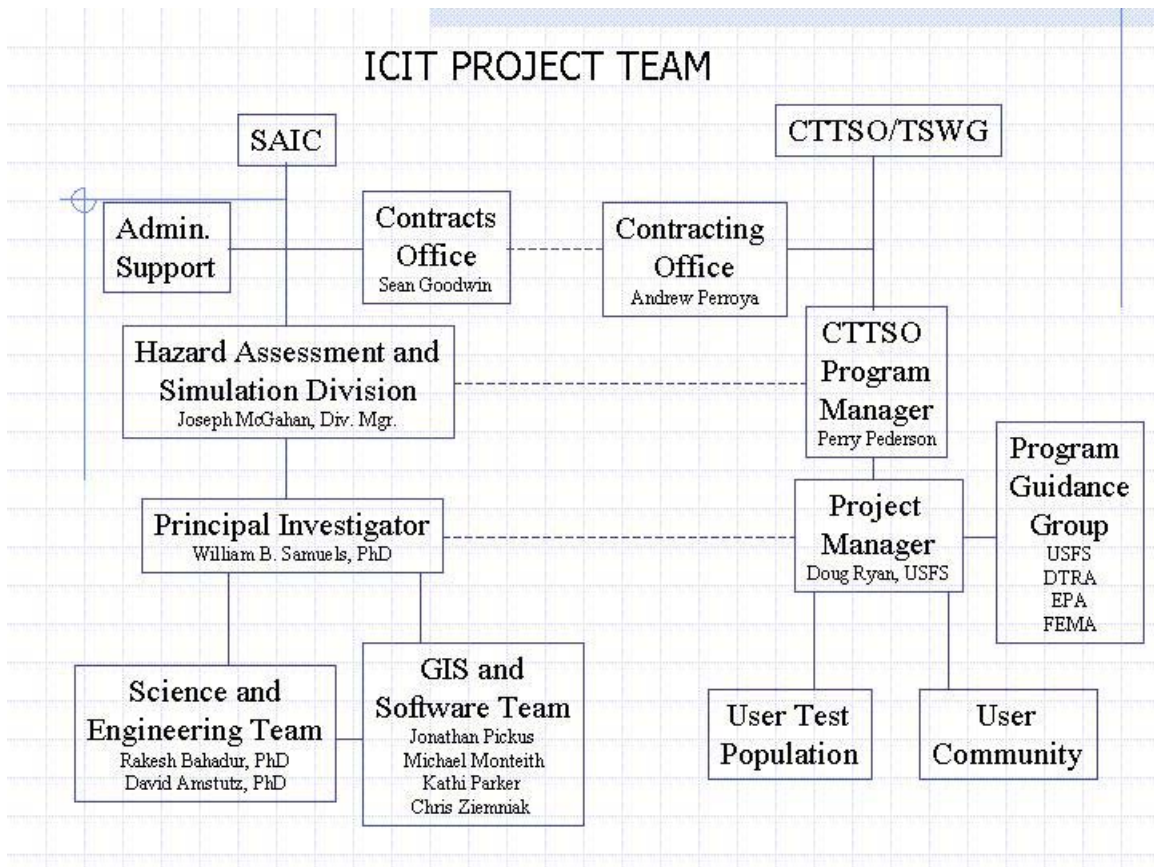


Exhibit 2. ICIT Project Organization Chart

Schedule

Exhibit 3a-c shows the project schedule in the form of a Gantt chart. All project deliverables are indicated by a diamond symbol on the chart. The schedule for this project is 24 months. Project management activities will take place during the entire project period of performance. The requirements phase will last 6 months. This phase begins with the project kickoff meeting (to be held within 45 days of project award). It concludes with the critical design review. The requirements phase will be followed by the pilot phase, which spans 12 months. During this phase a prototype (Alpha) system will be developed and tested. The project is concluded with the operational phase that lasts 6 months. This phase consists of Beta system testing, reconciliation of software errors, system administration functions, and configuration management functions. It concludes with the delivery of a technology transition plan and final report.

GOVERNMENT FURNISHED INFORMATION/EQUIPMENT/MANAGEMENT

The Government will provide SAIC with all relevant GIS-based government databases that are publicly available through government web sites. The Government will also make CATS, EPA's Situation Room, and HAZUS available to the extent necessary for the development of ICIT. The Government will provide SAIC access to EPA's Drinking Water Infrastructure Database (SDWIS) and Stream Reach Files, USGS's NHD, and the United States Department of Agriculture (Forest Service) drinking water facilities data.

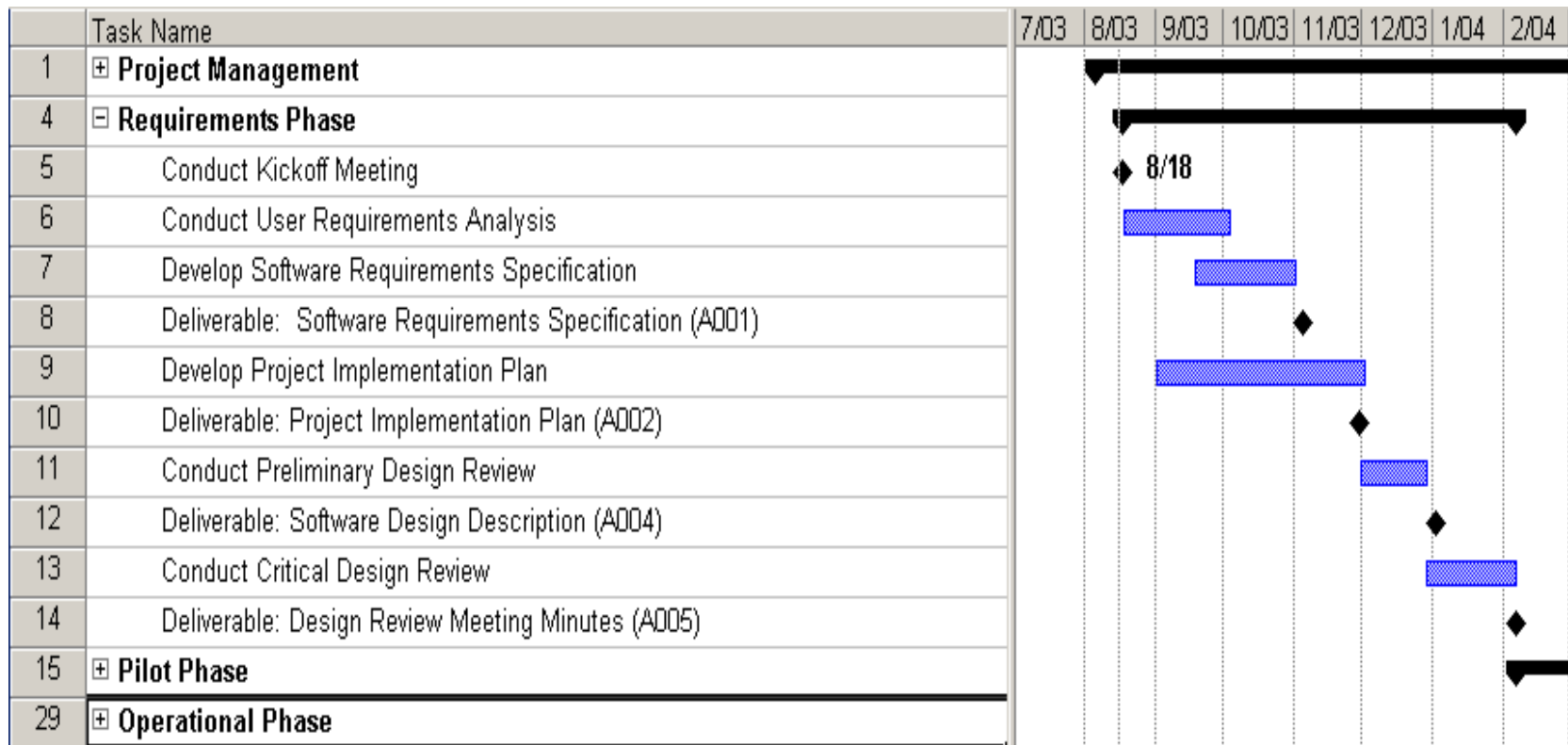


Exhibit 3a. Requirements Phase Schedule.

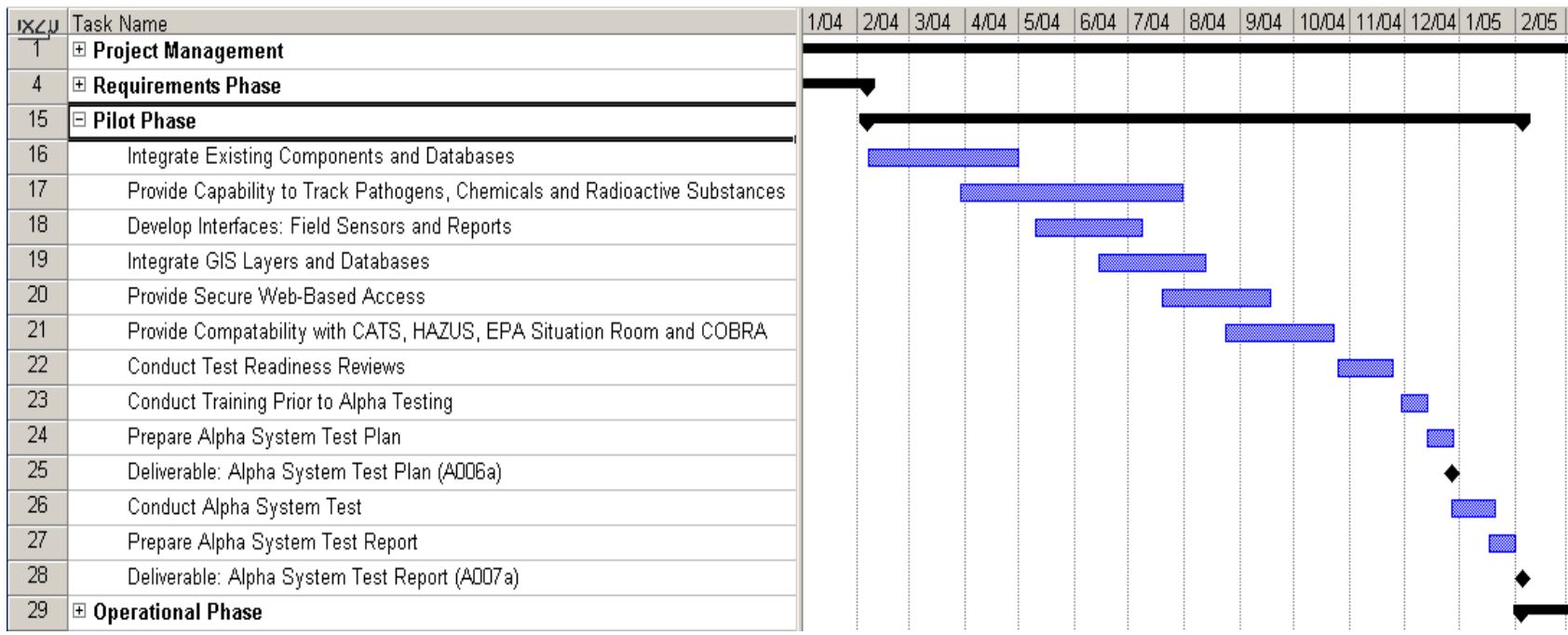


Exhibit 3b. Pilot Phase Schedule.

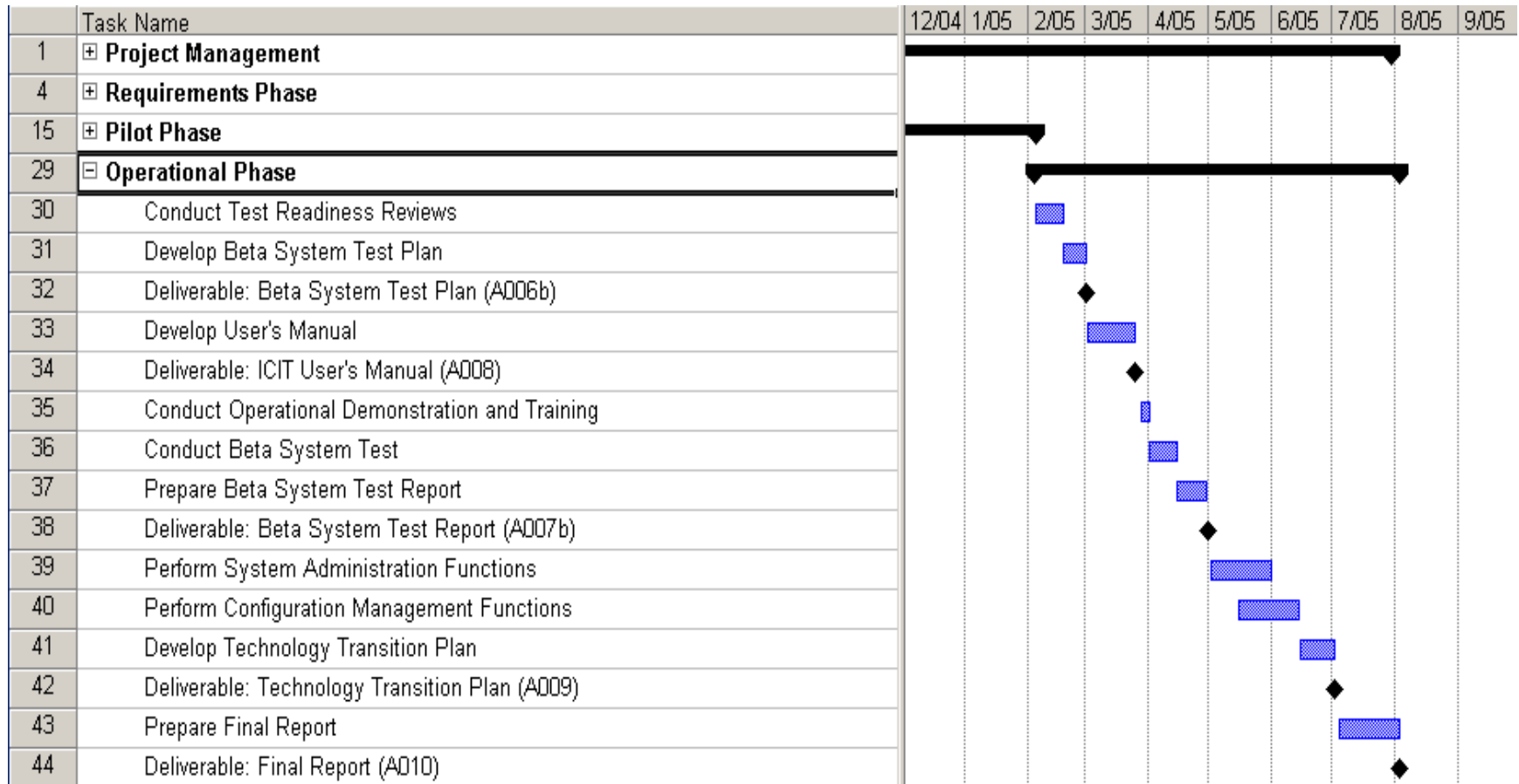


Exhibit 3c. Operational Phase Schedule.

DELIVERABLES

Computer Software and Databases

SAIC will deliver all ICIT computer software and the database applications developed under this project on electronic media with installation utility software. This includes but is not limited to executable software, source code, source listings, object code listings, design details, algorithms, processes, flow charts, formulae, and related materials that would enable the software to be reproduced, recreated, or recompiled. The ten deliverables associated with this project are listed below in Exhibit 4. Exhibit 3 shows the schedule for the preparation of each deliverable.

Data Deliverables

CDRL A001	Software Requirements Specification (SRS)
CDRL A002	Project Plan
CDRL A003	Monthly Status Report (MSR)
CDRL A004	Software Design Description (SDD)
CDRL A005	Meeting Support and Informal Technical Information
CDRL A006	Software Test Plan
CDRL A007	Software Test Report
CDRL A008	Software Users Manual
CDRL A009	Software Transition Plan (Technology Transition Evaluation)
CDRL A010	Scientific and Technical Reports (Final Report)

Exhibit 4. List of Project Deliverables