DRAFT - Statement of Work

Title: Operation and Maintenance of the Biological Data Processing System

A. Overall Objectives

The purpose of this contract is to provide software engineering, database design, commercial-off-the-shelf product support, mathematical and statistical support for the Information Technology Branch (ITB). This includes design and or/redesign of application programs as well as initial coding, revising, testing, documenting, operating and maintaining all custom software. The Contractor will work at their own location, but frequently be required to attend meetings with Project Officers at Government offices in Frederick and Rockville, MD.

Data communication between the Contractor's site and the NCI- Frederick, located in Frederick, MD will be the responsibility of the contractor. Technical support for troubleshooting and maintaining communications with NCI-Frederick computers will be available to the contractor, but the contractor will be responsible for obtaining and maintaining adequate Internet services.

The database operates in an Oracle RDBMS environment on a HP Integrity Server rx8620 using the VMS operating system. The software suite spans several generations of computing technologies. These technologies include:

- host based programs running in the VMS environment
- web-based applications running under Microsoft Windows IIS/ASP
- web-based applications running under Java2 Enterprise Edition
- CambridgeSoft Enterprise/Desktop Suite

Figure 1:

Environment	Tools
Oracle 1 0G	SQL*Net, PL/SQL
VAX/VMS	Digital Command Language (DCL), Module Management System (MMS), Code Management System (CMS), TCP/IP
Windows (MS, NT)	Visual Basic, Active Server Page, HTML, Adobe PDF Professional
JDK 1.5.0, WebLogic 9.2.0	JBuilder X, Java Server Page (JSP), Extensible Markup Language(XML), Java 2 Enterprise Edition (J2EE), Concurrent Versions System (CVS)
Cambridgesoft Enterprise Suite	E-notebook, BioAssay, BioSAR, Biological Inventory

The goal of the ITB is to consolidate this wide variation of technologies into a consistent architecture. The contractor shall be knowledgeable in the following products and technologies and shall migrate legacy applications from these technologies to the J2EE and/or CambridgeSoft architecture using programming languages and tools listed below:

Tools
SVG, XSLT, JavaScript, HTML, CSS, EJB, Struts, Hibernate, BEA Weblogic Server, Tomcat, Oracle RDBMS

B. Description of Work

1.0 Software Development

Independently, and not as an agent of the Government, the Contractor shall perform the services described below. The Contractor shall provide qualified personnel, material, equipment and facilities not otherwise provided by the Government during performance of this contract. The Contractor shall perform work on all phases of the software life cycle, including requirements analysis, system design, software development, testing, and implementation. The contract will require that solutions be implemented in a wide range of software environments (see figure 1) using many different programming tools.

    1.1 General Principals for Software Development (includes new software and upgrades to existing software)
        1.1.1 All software databases shall be compliant with current and future ITB data standards.
        1.1.2 All applications and data shall be designed to assure integration and interoperability.
        1.1.3 All applications shall be delivered in a timely fashion determined by the Project Officer
        1.1.4 All applications shall be user-friendly and meet the needs of staff as outlined during the project development.
        1.1.5 All new software shall be compliant with section 508 of the Rehabilitation Act.
        1.1.6 The Contractor shall design, develop and deliver software applications to address scientific, operational, and administrative needs. These applications shall be developed utilizing best practices and methodologies.

2.0 Software Testing
    2.1 General Principals regarding Software Testing:
        2.1.1 The Contractor shall develop and implement a process to validate that all new custom software or custom software upgrades perform as designed and do not adversely impact other custom applications.

2.1.2 The Contractor shall develop and implement processes and procedures to maintain the integrity and quality of new data.

3.0 Documentation

3.1 The Contractor shall develop, update and maintain all system documentation including technical system documentation.

4.0 Software Maintenance

4.1 Maintenance of all current and future applications is critical for continuous successful operations. Maintenance includes, but it not limited to the following:

- Corrective Maintenance - Correct any identified bugs in the system.
- Preventive - Modify system to maintain both effectiveness and reliability.
- Adaptive - Provide any modifications required to accommodate physical changes in the software environment. These might include, adapting to a new network topology, or reconfiguration to accommodate a new release of ORACLE.
- Perfective Maintenance - Add new functions to accommodate change in the requirements.
- Structural Reengineering – Modify systems to take advantage of new technology and improve software readability and modularity.

4.2 The Contractor shall perform all periodic operational tasks required to maintain the proper level of performance and integrity of all systems. This shall include all design and/or redesign of system program, verification and validation; initial coding; revision; testing; debugging; documentation for all system software.

4.3 All maintenance to the BDPS system shall be planned and executed with appropriate consideration paid to security issues.

4.4 The Contractor shall deploy all source code and documentation to the application server.

5.0 Transition/Phase-In

5.1 The Contractor shall assist in the transition of this contract to a successor contract. The transition period shall consist of the final 30 calendar days of the contract. On the 31 calendar day, the successor will assume all responsibilities. The following shall apply only to a transition wherein the contractor is not the recipient of the successor award.

5.1.1 The Contractor shall provide the successor with detailed briefings regarding the structure of the database tables and software required continuing maintenance and operation of systems developed under this contract.

5.1.2 The Contractor shall transfer all project materials to the successor Contractor upon direction from the Contracting Officer and in a manner

prescribed by the Project Officer(s). Transfer shall be completed by the expiration date of the contract and shall include provision by the incumbent Contractor of accurate and complete data files and pertinent documentation.

5.1.3 The Contractor shall transfer the source files and documentation for all software developed on this contract to the successor Contractor. Transfer shall be completed by the expiration date of the contract and shall include provision by the incumbent Contractor of accurate and complete source files and documentation for all software developed.

5.1.4 For a contractor other than the incumbent provide a detailed plan and timetable for implementing the transition from the current facility to the proposed facility. The Contractor shall be responsible for the physical move of all inventories. The move shall be accomplished prior to the effective date of the contract.

6.0 Miscellaneous

6.1 The Contractor shall participate, as needed, in joint government personnel and government contractor's software development efforts, which include software development, database integration, and implementation of shared information management resources

7.0 Staff Experience Requirements

The Project Manager shall be considered a key person and should devote 50% of his or her time to this project. The Project Manager shall be expected to perform as a senior level developer as well as manage the overall efforts of the development team. The Project Manager shall have extensive experience with the full life cycle of large applications projects and the following experience:

- Within the last ten (10) years, the Project Manager shall demonstrate eight (8) years of experience with application systems design and development, three (3) of which are at the management level.
- Within the last seven (7) years, the Project Manager shall have five (5) recent years working in an ORACLE environment on a VAX/VMS platform.
- Experience managing the development of large biological database systems within the last four (4) years.
- Experience managing a software development team in a J2EE environment using web-based BEA WebLogic application server front end tools and ORACLE as a database server within the last four (4) years
- Experience developing in a J2EE environment.

Programmer Analysts

The two Analysts shall be committed full time to this project. Within the last eight (8) years, the Analysts shall demonstrate six

(6) years of experience with application system design and development. Within the last six (6) years the Analysts shall demonstrate four (4) years of experience designing and developing systems in an ORACLE/Java/J2EE environment.

At least one (1) analyst shall possess experience implementing solutions using the CambridgeSoft Enterprise Software Suite. The experience should document requirements analysis, template configuration and processing, as well as support for subsequent data mining techniques.

Programmer

The Programmer shall be committed full-time to this project and shall have experience with full life cycle of large application projects. Within the last six (6) years, the Programmer shall have six (6) years experience with ORACLE within the last six (6) years and two (2) years experience with J2EE/Java environment.

The application portfolio listed in the table below has documentation available in the electronic reading room at:

http://dtp.cancer.gov/BDPSAcqusitionPlan2009ReadingRoom/

System Name	Description	System Tools
Aids Decisions	Supports the evaluation of Aids screening results	J2EE
Antimicrobial Activity	Antimicrobial DB and reporting of activity reports	J2EE
Assignment	Support the assignment and availability of Cancer compounds	J2EE
BEC Minutes	Supports maintaining detail minutes, action items, and monthly reports	J2EE
Cancer Decisions	Supports the evaluation of Cancer screening results	PL/SQL
Combination/Fractionation	Supports assignment of Combination/Fractionation compounds	J2EE
COMMON	Lookup tables and functions that are referenced BDPS systems	Oracle Database Only
Data Warehouse	Supports common data architecture for biological data available to public researchers	PL/SQL
Generic Plate Loader	Supports the screening laboratories plate data	J2EE
High Throughput Prescreen	Supports the cell-based anti-cancer compound 384 well plate format for screening	Oracle Database Only

Hollow Fiber Analysis/Spreadsheet	Support the Hollow Fiber *in vivo* assay. It involves implanting hollow fibers contain cancer cell lines into animals, treating the animals with drugs and then removing the fibers and testing them *in vitro*	J2EE
Hollow Fiber Scoring	Supports data summarization of the *in vivo* hollow fiber assay	J2EE
Hollow Fiber Setup	Supports initial indices of *in vivo* drug efficacy Hollow Fiber screen	J2EE
Hollow Fiber Calculation	Supports calculation module for Hollow Fiber screen	PL/SQL
In vivo Presentation	Produces presentation-quality graphs for the *in vivo* screen.	J2EE
In vivo Detailed Graphics	Produces graphs of the animals in an *in vivo* test group	J2EE
In vivo Calculation	Supports the evaluation of clinical efficacy *in vivo* screening results	PL/SQL
Material Safety Data Sheets	Supports know hazard and safety information on each compound for NCI repository	Active Server Page JavaScript
Molecular Target Screening	Supports for a cell based screen for inhibitors	J2EE
Natural Product Tracking	Supports Natural Products processing and shipments of extracts	Active Server Page JavaScript
Natural Product Raw Material	Supports Natural Products collection of extracts	J2EE
Natural Products Plant Header	Supports the protocols from 1959-1972 for screening Natural Products against *in vitro* biological system	J2EE
PreScreen (Natural Products and Synthetic)	Supports the cell-based anti-cancer compound Prescreen screening database	Oracle Database Only
Screening System Aids	Support the cell-based antiviral screenings assays, which examine the anti-HIV activity of synthetic and pure natural product compounds	Oracle Database Only
Screening System Cancer	Support the cell-based anti-cancer compound screening, which examine activity of synthetic and pure natural product compounds	Database modules packages, procedures, functions, triggers, DCL scripts, SQL*Plus scripts

Screening System OneDose	Support the cell-based anti-cancer compound screening program for 60 cell lines at a single dose which examine the activity of synthetic and pure natural product compounds	Database modules packages, procedures, functions, triggers, DCL scripts, SQL*Plus scripts
Screening System *in vitro*	*in vitro* Cell Line Screening System (IVSS). IVSS is designed to screen compounds for potential anticancer activity	Database modules packages, procedures, functions, triggers, DCL scripts, SQL*Plus scripts, J2EE
Supplier Report	Maintains and support the Supplier Reporting System (SRS) providing graphical and tabular reports used for in-house evaluation of anti-cancer and anti-AIDS screens	J2EE
Supplier Report Cancer Package	Two procedures called from with Java modules	Oracle PL/SQL
Stanford/ARL	Oracle	Oracle Database Only
Supplier Notification	Oracle Batch Job sends email to suppliers about data availability	Oracle Database/Oracle Batch Jobs
Task Tracking	Support the assign compounds to a branch for a particular task.	J2EE
Test Counts	Supports the reporting of statistics for screening	J2EE
Test History	Supports the reporting of compounds complete in the different anti-cancer screens	J2EE
Time Course Assay	Support the web-based system to facilitate data capture, calculation, analysis, presentation and efficient database retrieval for allowing a ranking of cell line sensitivities on the basis of time-relevant drug exposure conditions	Active Server Pages JavaScript J2EE

Appendix 1: Glossary of Terms

ASP - Active Serve Page

BDPS - Biological Data Processing System

BEA - WebLogic - Application Server

CMS - Code Management System

CSS - Cascading Style Sheets

CO - Contracting Officer

COTS – Commercial-off-the-shelf Software

CVS - Concurrent Versions System

DBMS - Database Management System

DCL - Digital Command Language

DCTD - Division of Cancer Treatment and Diagnosis, NCI

DHHS - Department of Health and Human Services

EJB - Enterprise Java Beans

Hibernate - Object-relation mapping library for the Java language

HTML - Hyper Text Markup Language

ITB - Information Technology Branch

JSP - Java Server Page

J2EE - Java 2 Enterprise Edition

LAN - Local Area Network

MMS - Module Management System

NCI - National Cancer Institute

NIH - National Institutes of Health

PBSC - Performance-Based Service Contracting

ORADIS - NCI Drug Information System

PDF - Portable Document Format

PL/SQL - Procedural Language/Structured Query Language

PO - Project Officer

PRS - Performance Requirements Summary

Struts - open-source web application framework for developing web applications

QA - Quality Assurance

QASP - Quality Assurance Surveillance Plan

RDBMS - Relational Data Base Management System

SVG - Scalable Vector Graphics

XML - Extensible Markup Language

XSLT - Language for transforming XML documents into other XML documents.