

Annual Surgery Update (ASU) Phase II System Design Document



Department of Veterans Affairs

January 2015

Version 0.2

Revision History

Date	Version	Description	Author
12/2/2014	0.1	Initial draft version	PMO Support Team
01/14/2015	0.2	Updates specific to the current effort	PMO Support Team

Artifact Rationale

The System Design Document (SDD) is a dual-use document that provides the conceptual design as well as the as-built design. This document will be updated as the product is built, to reflect the as-built product. Per the Project Management Accountability System (PMAS) Guide, the SDD as a conceptual design is required prior to the Milestone 1 Review. (Sections 1, 2, 3, 4, 5, 7, 9 need to be populated, as applicable.) The as-built design for each delivery must be incorporated prior to the Milestone 2 Review. (The entire document needs to be populated or updated, as applicable.)

Table of Contents

1. Introduction	1
1.1. Purpose of the SDD	1
1.2. Identification	1
1.3. Scope	2
1.4. Constraining Policies, Directives and Procedures	2
1.5. User Characteristics	2
1.5.1. User Problem Statement	3
1.5.2. User Objectives	4
1.6. Relationship to Other Documents and Plans	5
1.7. Definitions, Acronyms, and Abbreviations	5
1.8. References	6
2. Background	7
2.1. Overview of the System	7
2.2. Overview of the Business Process	7
2.3. Business Benefits	7
2.4. Assumptions and Constraints	7
2.4.1. Design Assumptions	7
2.4.2. Design Constraints	8
2.4.3. Design Trade-offs	8
2.5. Overview of the Significant Requirements	8
2.5.1. Overview of Significant Functional Requirements	8
2.5.2. Overview of Functional Workload / Performance Requirements	8
2.5.3. Overview of Operational Requirements	9
2.5.4. Overview of the Technical Requirements	9
2.5.5. Overview of the Security or Privacy Requirements	9
2.5.6. Overview of System Criticality and High Availability Requirements	10
2.5.7. Single Sign-on Requirement	10
2.5.8. Requirement for Use of Enterprise Portals	10
2.5.9. Special Device Requirements	10
2.6. Legacy System Retirement	10
3. Conceptual Design	11
3.1. Conceptual Application Design	11
3.1.1. Application Context	11
3.1.2. High-Level Application Design	11
3.1.3. Application Locations	11
3.2. Conceptual Data Design	11
3.2.1. Project Conceptual Data Model	11

3.2.2.	Database Information	11
3.2.3.	User Interface Data Mapping.....	11
3.2.3.1.	Application Screen Interface	11
3.2.3.1.1.	<Insert name of screen>	11
3.2.3.2.	Application Report Interface.....	11
3.2.3.2.1.	<Insert name of report>	11
3.2.3.3.	Unmapped Data Element.....	11
3.3.	Conceptual Infrastructure Design	12
3.3.1.	System Criticality and High Availability	12
3.3.2.	Special Technology	12
3.3.3.	Technology Locations	12
3.3.4.	Conceptual Infrastructure Diagram	12
3.3.4.1.	Location of Environments and External Interfaces	12
3.3.4.2.	Conceptual Production String Diagram	12
4.	System Architecture.....	13
4.1.	Hardware Architecture	13
4.2.	Software Architecture	13
4.3.	Network Architecture	13
4.4.	Service Oriented Architecture / ESS	13
4.5.	Enterprise Architecture	13
5.	Data Design	14
5.1.	DBMS Files.....	14
5.2.	Non-DBMS Files.....	14
5.3.	Data View	14
6.	Detailed Design	15
6.1.	Hardware Detailed Design.....	15
6.2.	Software Detailed Design.....	15
6.2.1.	Conceptual Design	15
6.2.1.1.	Product Perspective.....	15
6.2.1.1.1.	User Interfaces	15
6.2.1.1.2.	Hardware Interfaces	15
6.2.1.1.3.	Software Interfaces	15
6.2.1.1.4.	Communications Interfaces.....	15
6.2.1.1.5.	Memory Constraints.....	15
6.2.1.1.6.	Special Operations	15
6.2.1.2.	Product Features	15
6.2.1.3.	User Characteristics	15
6.2.1.4.	Dependencies and Constraints	15
6.2.2.	Specific Requirements	16
6.2.2.1.	Database Repository	16
6.2.2.2.	System Features.....	16
6.2.2.3.	Design Element Tables.....	16
6.2.2.3.1.	Routines (Entry Points).....	16

6.2.2.3.2.	Templates.....	16
6.2.2.3.3.	Bulletins.....	16
6.2.2.3.4.	Data Entries Affected by the Design	16
6.2.2.3.5.	Unique Record(s).....	16
6.2.2.3.6.	File or Global Size Changes.....	16
6.2.2.3.7.	Mail Groups.....	16
6.2.2.3.8.	Security Keys.....	16
6.2.2.3.9.	Options	16
6.2.2.3.10.	Protocols.....	16
6.2.2.3.11.	Remote Procedure Call (RPC).....	16
6.2.2.3.12.	Constants Defined in Interface	16
6.2.2.3.13.	Variables Defined in Interface	17
6.2.2.3.14.	Types Defined in Interface.....	17
6.2.2.3.15.	GUI.....	17
6.2.2.3.16.	GUI Classes	17
6.2.2.3.17.	Current Form	17
6.2.2.3.18.	Modified Form.....	17
6.2.2.3.19.	Components on Form.....	18
6.2.2.3.20.	Events	18
6.2.2.3.21.	Methods	18
6.2.2.3.22.	Special References.....	18
6.2.2.3.23.	Class Events.....	18
6.2.2.3.24.	Class Methods.....	18
6.2.2.3.25.	Class Properties.....	18
6.2.2.3.26.	Uses Clause.....	18
6.2.2.3.27.	Forms.....	18
6.2.2.3.28.	Functions	18
6.2.2.3.29.	Dialog	18
6.2.2.3.30.	Help Frame	18
6.2.2.3.31.	HL7 Application Parameter	19
6.2.2.3.32.	HL7 Logical Link	19
6.2.2.3.33.	COTS Interface	19
6.3.	Network Detailed Design.....	19
6.4.	Service Oriented Architecture / ESS Detailed Design	19
6.4.1.	Service Description for <Consumed Service Name>.....	19
6.4.2.	Service Design for <Provided Service Name>	19
6.4.2.1.	Introduction.....	19
6.4.2.1.1.	Purpose and Scope of Service	19
6.4.2.1.2.	Links to Other Documents	19
6.4.2.2.	Service Details.....	19
6.4.2.2.1.	Service Identification	19
6.4.2.2.2.	Service Versions	19
6.4.2.2.3.	Summary of Design and Platform Details	20
6.4.2.2.3.1.	SOA Pattern(s) Implemented.....	20
6.4.2.2.3.2.	COTS Platform vendor names and versions for hosting platform.....	20
6.4.2.3.	Dependencies.....	20
6.4.2.4.	Service Design Details.....	20
6.4.2.4.1.	Interface Technical Specs	20
6.4.2.4.1.1.	Service Invocation Type.....	20

6.4.2.4.1.2.	Service Interface Type	20
6.4.2.4.1.3.	Service Name	20
6.4.2.4.1.4.	Interface	20
6.4.2.4.1.5.	End Points	20
6.4.2.4.1.6.	Operations or Methods	20
6.4.2.4.1.7.	Message Schemas.....	21
6.4.2.4.2.	Information Model	21
6.4.2.4.2.1.	Class Diagram and Description of Entities Involved	21
6.4.2.4.2.2.	Mappings from ELDM to Standards Based Schemas	21
6.4.2.4.3.	Behavior Model (AKA Use Case Realization)	21
6.4.2.4.3.1.	Use Cases (Use Case Model).....	21
6.4.2.4.3.2.	Interaction Diagrams	21
6.4.2.5.	Gap Analysis	21
6.4.2.5.1.	Variances from Enterprise Target Architecture	21
6.4.2.5.2.	Variances from SLDs.....	21
6.4.2.5.3.	Variances from Standards and Policies	21
6.4.2.5.4.	Justification for Exceptions and Mitigation.....	21
7.	External System Interface Design	22
7.1.	Interface Architecture.....	22
7.2.	Interface Detailed Design	22
8.	Human-Machine Interface	23
8.1.	Interface Design Rules	23
8.2.	Inputs	23
8.3.	Outputs	23
8.4.	Navigation Hierarchy.....	23
8.4.1.	Screen [x.1]	23
8.4.2.	Screen [x.2]	23
8.4.3.	Screen [x.3]	23
9.	Security and Privacy	24
9.1.	Security	24
9.2.	Privacy	24
	Attachment A – Approval Signatures.....	25
A.	Additional Information	26
A.1.	RTM	26
A.2.	Packaging and Installation.....	26
A.3.	Design Metrics	26
A.4.	Acronym List and Glossary	26
A.5.	Required Technical Documents.....	28
A.6.	Attach Documents	28

1. Introduction

The Annual Surgery Update Phase II project will address enhancements to the existing Risk Assessment Module within the VistA Surgery application in support of the VA Surgery Quality Improvement Program (VASQIP) as well as update and create data fields to support the National Surgery Office and the Surgery Application. Enhancements are mainly field definitions and data entry screen changes needed to keep the data collection current in regards to risk indicators for Surgery.

1.1. Purpose of the SDD

This System Design Document (SDD) presents an overview of the ASU Phase II enhancement design. The purpose of this document is to describe the construction of the ASU Phase II Enhancements and provide details of the top-level system architecture including hardware, software, communication, and interface components.

1.2. Identification

The initial rollout of the ASU Phase II Enhancements will be Version 1.0. The following standards apply to the design and development of the system.

1. [OMB Circular No. A-130, Management of Federal Information Resources](#)
2. [OMB Circular No. A-11, Preparation, Submission and Execution of the Budget](#)
3. [VA Earned Value Management System \(VA Directive 6061\)](#)
4. [OIT OED Change Control Process Plan](#)
5. [NIST 800-30](#)

The ASU Phase II application shall conform to standards defined by the Veterans Health Administration (VHA)-endorsed version of:

6. HL7 Standard
7. C 38 - HITSP Patient Level Quality Data Document Using IHE Medical Summary (XDS-MS) Component when communicating patient level quality data for analysis and measurement.
8. C 32 - HITSP Summary Documents Using Health Level 7 (HL7) Continuity of Care Document (CCD) Component when exchanging data summarizing a patient's medical status.
9. C 48 - HITSP Encounter Document Using IHE Medical Summary (XDS-MS) Component when sending patient encounter data (excluding laboratory and radiology) for use in transfer of care scenarios.
10. VA Master Veteran Index (MVI) HL7v2.4 messaging

In addition, the ASU Phase II application shall:

11. Use current standards of terminology (LOINC, SNO-Med).
12. Reference the Standard Data Services (SDS) as the authoritative source to access non-clinical reference terminology.

1.3. Scope

Table 1: Scope Inclusions

Includes
All software required to meet validated ASU Phase II requirements
All hardware required to meet validated ASU Phase II requirements
All interfaces to existing VA systems required to provide information to or receive information from ASU Phase II

Table 2: Scope Exclusion

Excludes
Activities such as training, maintenance, testing, installation etc.

1.4. Constraining Policies, Directives and Procedures

ASU Phase II implementation will be based on

1. VA procedures such as *PMAS* and *ProPath*,
2. Federal mandates such as Health Insurance Portability and Accountability Act (HIPAA)
3. [VA DIRECTIVE 6508 - Privacy Impact Assessments](#)
4. [VA Directive 6500 – Information Security Program](#)

1.5. User Characteristics

The users of the ASU Phase II Enhancements include medical professionals and surgery administrators. They are highly educated with years of experience regarding the tools and process in their surgical field. Administrative and ancillary personnel will also be using ASU Phase II in limited specialty areas or tasks.

ASU Phase II will collect information from a variety of existing VA information systems and provide ASU Phase II - originated information to VA systems of interest; integrating information from many of those systems and providing the users a more integrated view of the data. ASU Phase II system users will generally have experience with existing VA systems that have similar operational methodologies and complimentary functionality. ASU Phase II is designed to replace and enhance the capabilities currently provided by VistA Surgery. The primary and secondary users are identified in the table below.

Table 3 – ASU Phase II Primary, Secondary and Quality Users

Name	Description	Responsibilities
Primary Users	Surgeons Anesthesiologists Consulting Clinicians (Pulmonary, Cardiology, etc.) Nurses (clinic, operating room (OR), Patient Acute	Look up patient information, schedule patient consults and tests, track medical and surgical readiness, schedule patient surgery, schedule ancillary services, track patient status IntraOp surgery, and collect clinical information during patient encounters. Review workload and utilization reports to improve OR efficiency.
	Administrative staff involved with Surgery (clinics, scheduling, etc.)	Looks up patient information, schedules patient consults and tests, schedules patient surgery, schedules ancillary services, tracks patient status IntraOp surgery, generates efficiency reports, and responds to regional, national office data requests.
Secondary Users	Ancillary Services (Sterile Processing, Imaging, Pharmacy, Pathology, Blood Bank, Lab, Transport, Bed Management, etc.) Primary care providers	Receive requests for equipment, supply, and personnel needs Receive bed requests View patient information, view scheduling information View wait times, complexity View wait time, efficiency, quality, and complexity reports
Quality Users	National Surgery Quality Improvement Program (VASQIP) Veterans Integrated Service Network (VISN) and Central Office Surgery	View wait times, generate and oversee quality outcomes, and complexity View wait time, efficiency, quality, and complexity reports

1.5.1. User Problem Statement

Key business drivers, which are tied to strategic goals at the VHA, make ASU Phase II a high priority for development on an accelerated basis. The following business drivers have been identified for the ASU Phase II project:

- The Office of Inspector General (OIG) has recommended that the Under Secretary of Health (USH) develop and implement a national quality management directive. This directive should include a standardized structure and mechanism throughout VHA for collecting and reporting quality management data and a mechanism to verify that VHA's diagnostic and therapeutic interventions are appropriate to the capabilities of the medical facility. The Operative Complexity & Infrastructure Standards Workgroup and the Surgery Quality Workgroup that were convened as a result of the OIG report both require additional national oversight of surgery quality complexity, and patient outcomes. ASU Phase II automates these processes and provides timely data on quality and complexity. The data collection will be expanded to meet the requirements of these reports, including the development of metrics/processes to enhance granular assessments of surgical program quality to supplement aggregated, risk-adjusted data and to acquire data from Anesthesia Record Keeper systems (ARKs) where installed.
- Congress and the OIG have both expressed concern related to long wait times for elective surgery. The ASU Phase II solution addresses the VHA's recommendations and is essential to more effectively manage and report on wait time issues.
- ASU Phase II will enable entry of all surgical implants into VA Implant Tracking and Alert

System (VITAS) to identify their patients with implanted tissues/devices in case of safety alerts/recall.

- Efficiently managing the patient through the pre-surgical process is essential to patient safety and satisfaction. ASU Phase II will provide surgery staff with the capability to track and manage patients through the complex surgical process.
- The resources necessary to support surgery are costly and require utilization with peak efficiency. ASU Phase II will help surgery managers more efficiently manage utilization rates for cost intensive resources, such as operating rooms. ASU Phase II will also bring efficiencies to ancillary services that support surgery such as imaging and sterile processing by providing timely and accurate requests for services and supplies.
- Joint Commission (JC) and other patient safety organizations have required or recommended implementation of patient safety goals such as time outs prior to surgery, debriefing after surgery, checklists, documented handoffs, and so forth. Currently, a uniform process for implementing and documenting such processes does not exist in the existing surgical package. ASU Phase II will implement such requirements in a standardized fashion and allow national tracking of compliance.
- In the absence of an enterprise level surgical product, many Medical Centers have turned to local development of electronic mechanisms to meet their needs. This increases operations and maintenance costs at the local level, may lead to dual data entry as a VAMC inputs data into both the local product as well as into the Computerized Patient Record System (CPRS)/Veterans Health Information Systems and Technology Architecture (VistA), and does not necessarily meet national objectives for data collection and consistency.
- The need exists to improve the ability to enter and track critical safety measurements of all equipment, including modern equipment such as laser wattage or fluoroscopy time. ASU Phase II will provide the ability to enter and collect critical safety measurement information.

1.5.2. User Objectives

The ASU Phase II project aims to deliver functionality that will benefit Veterans by implementing a system that enables the tracking of surgery patients through the pre-surgical process, scheduling of surgery, and the peri-operative period. Planned ASU Phase II functions include the following:

- Update data definitions for the data fields currently captured to align with current VHA policy and clinical standard of care.
- Update to new Current Procedural Terminology (CPT) codes, update the VA Surgical Quality Improvement Program (VASQIP) inclusion/exclusion assignment by surgical procedure, and surgical complexity procedure code designation in alignment with current VHA policy and clinical standard of care.
- Add additional data fields for safety documentation.
- Calculation of preoperative risk based upon VASQIP variables.
- Capability of surgical coders to enter a CPT code and ICD-10 procedure code for all completed surgical procedures.

- Administrative capture of new data fields for surgical specialties not currently included in VASQIP surgical outcome analysis.
- Administrative capture of new data fields currently entered manually through chart review of VASQIP. This requirement is dependent upon VHA/OIA capability to query CPRS and transfer data to VistA Surgery Package.

1.6. Relationship to Other Documents and Plans

The ASU Phase II Enhancements design is based on the requirements expressed in the:

1. ASU Phase II Business Requirements Document
2. ASU Phase II Requirements Specification Document
3. ASU Phase II Configuration Management Plan included in approved ASU Phase II Project Management Plan
4. ASU Phase II Project Management Plan

The following documents have not yet been developed, but will be developed at a later date in conjunction with the selected integration contractor and any changes that they require in this design document will be incorporated into this document at that time. These documents include the:

1. Software Quality Assurance Plan
2. System Security Plan
3. System Deployment Plan
4. Systems Operation Manual

For additional information, please see the following:

1. [ASU Phase II TSPR](#) – The central repository for all approved and released ASU Phase II project documentation.
2. [ASU Phase II Share Point](#)– The repository for working ASU Phase II project documentation, containing requirements, proposed architectures, and tools. For access, please contact the SQWM Project Manager.

1.7. Definitions, Acronyms, and Abbreviations

Term	Definition
BMS	Bed Management System
BPMS	Business Process Management Software
BRD	Business Requirements Document
CCHIT	Certification Commission of Health Information Technology
CCOW	Clinical Context Object Workgroup
COTS	Commercial Off the Shelf

Term	Definition
CPRS	Computerized Patient Record System
DoD	Department of Defense
EDIS	Emergency Department Information System
IT	Information Technology
CCHIT	Certification Commission of Health Information Technology
HIPAA	Health Insurance Portability and Accountability Act
ISO	International Organization for Standardization
NHIN	Nationwide Health Information Network
NSR	New Service Request
OHI	Office of Health Information
OI&T	Office of Information and Technology
OR	Operating Room
PACU	Post Anesthesia Care Unit
PCP	Primary Care Physician
RTM	Requirements Traceability Matrix
SLR	Service Level Requirements
SME	Subject Matter Expert
SCM	Surgery Case Manager
TWG	Technical Working Group
UCD	User Centered Design
UI	User Interface
VA	Department of Veterans Affairs
VHA	Veterans Health Administration
VISN	Veterans Integrated Service Network
VistA	Veterans Health Information Systems and Technology Architecture
WHO	World Health Organization

1.8. References

None

2. Background

The Annual Surgery Update Phase II project will address enhancements to the existing Risk Assessment Module within the VistA Surgery application in support of the VA Surgery Quality Improvement Program (VASQIP) as well as update and create data fields to support the National Surgery Office and the Surgery Application. Enhancements are mainly field definitions and data entry screen changes needed to keep the data collection current in regards to risk indicators for Surgery.

2.1. Overview of the System

The scope of the ASU Phase II Enhancements development includes: interface development, AITC installation, testing, training, software maintenance and optimization, workflow optimization, and recommended hardware specifications. In addition, user support and training services will be provided to facilitate a successful implementation and rollout. Training and user manuals, maintenance, and sustainment documentation will also be provided.

The specific high-level requirements are:

- Update data definitions for the data fields currently captured to align with current VHA policy and clinical standard of care.
- Update to new Current Procedural Terminology (CPT) codes, update the VA Surgical Quality Improvement Program (VASQIP) inclusion/exclusion assignment by surgical procedure, and surgical complexity procedure code designation in alignment with current VHA policy and clinical standard of care.
- Add additional data fields for safety documentation.
- Calculation of preoperative risk based upon VASQIP variables.
- Capability of surgical coders to enter a CPT code and ICD-10 procedure code for all completed surgical procedures.
- Administrative capture of new data fields for surgical specialties not currently included in VASQIP surgical outcome analysis.
- Administrative capture of new data fields currently entered manually through chart review of VASQIP. This requirement is dependent upon VHA/OIA capability to query CPRS and transfer data to VistA Surgery Package.

2.2. Overview of the Business Process

None

2.3. Business Benefits

Refer to Section 5 and Section 6 of the Business Requirements Document located in [ASU Phase II TSPR](#).

2.4. Assumptions and Constraints

None

2.4.1. Design Assumptions

ASU Phase II project will design, develop, test, deploy, and support all custom code and interfaces required to enable the application to operate in the VA environment and to satisfy the VA ASU Phase II requirements.

2.4.2. Design Constraints

- ASU Phase II will store a wide variety of Personally Identifiable Information (PII). Each module of ASU Phase II and the entire ASU Phase II Enhancements shall be designed to assure protection of all PII.
- ASU Phase II shall use only the VA enterprise messaging infrastructure consisting of Naming Directory Service (NDS), Remote Procedure Call (RPC) Broker, M2M Broker, VistALink, HealtheVet
- Web Services Client (HWSC), HL7 / Health Level 7 Optimization (HLO) engine, Veterans' Benefits Administration (VBA) connections, and National Cemeteries Administration (NCA) connections, to exchange messages. Other messaging services include VistAWeb and Medical Domain Web Services (MDWS).
- The primary ASU Phase II servers and storage shall be located at the AITC, an existing VA facility, using a centralized physical deployment across 11 partitioned deployment instances. A backup ASU Phase II capability will be deployed at the PITC location to facilitate disaster recovery.
- The ASU Phase II design shall be compliant with the VA Enterprise Architecture and VA policies and procedures unless an explicit written waiver is provided to the integrator and the ASU Phase II project manager.
- Any proposed hardware and software included must be per VA Technical Reference Model (TRM).

2.4.3. Design Trade-offs

None

2.5. Overview of the Significant Requirements

The material in this section is not to replace either the existing functional and technical requirements documents, nor serve as the basis for the Requirements Traceability Matrix (RTM), but only to inform non-project personnel reading this document as to the basis for the design.

2.5.1. Overview of Significant Functional Requirements

Please refer to Section 3 of the BRD located in the [ASU Phase II TSPR](#).

2.5.2. Overview of Functional Workload / Performance Requirements

Here are the ASU Phase II's functional workload and functional performance expectations.

- ASU Phase II shall be installed and operated to support:
 - 21 Veterans Integrated Service Networks
 - 130 Hospitals performing surgery
 - 754 Operating rooms
 - A minimum of 400,000 cases per year
 - Approximately 6000 Surgeons

- All schedule changes shall be available within ASU Phase II not more than (TBD) seconds after they are entered into any of the systems with which ASU Phase II interfaces.

2.5.3. Overview of Operational Requirements

ID	Requirement
NA	The ASU Phase II Application shall be capable of “Lights-Out” Facilities. The Data Centers will operate as “lights-out” facilities. Assume there is no local VA staff available for routine operations. All equipment shall be capable of remote access and remote restarts.
NA (Support Procedure Constraint)	ASU Phase II operations shall not require scheduled downtime between the hours of 6AM and Midnight Eastern Time on days for which routine surgeries are scheduled

Table 4: Operational Requirements

2.5.4. Overview of the Technical Requirements

ID	Requirement
<Requirement Number from Functional Requirement Document>	ASU Phase II shall be implemented using technologies currently authorized by VA TRM and consistent with the existing VA Enterprise Architecture (EA), and consistent with VA policies and procedures
	ASU Phase II shall be able to be deployed on virtualized servers and networks to allow VA to either 1) deploy ASU Phase II onto existing VA servers and networks or 2) allow other new VA applications to share infrastructure deployed for ASU Phase II
	ASU Phase II will be deployed into existing VA IT facilities and will be designed, deployed, and operated in conformance with VA IT facilities where ASU Phase II is deployed
	ASU Phase II interfaces with existing VA systems will use communication mechanisms and protocols that are currently approved for use as part of Class 1 applications and currently operational in VA
	ASU Phase II user interfaces and GUI shall be designed to be fully operational on currently deployed VA desktops, laptops, and handheld devices and shall allow the concurrent operation of ASU Phase II and current VA systems deployed to those devices

Table 1: Technical Requirements

2.5.5. Overview of the Security or Privacy Requirements

ID	Requirement
<Requirement Number from Functional Requirement Document>	The ASU Phase II application shall comply with patient privacy requirements and rights dictated by final HIPAA regulations as they have been interpreted by VHA and General Counsel and the Privacy Act.
	The ASU Phase II application shall provide for, as a highly sensitive application from a data availability, confidentiality, and/or integrity perspective (as determined by the system security plan and risk assessment in accordance with VA policy and sensitivity guidelines), "before" and "after" pictures of each modified record (or the data element(s) changed within a record) shall be captured by the audit trail.
	The ASU Phase II application shall provide for Unique User Identification Assign a unique name and/or number for identifying and tracking user identity.
	ASU Phase II shall successfully complete the VA Certification and Accreditation (C&A) process and obtain an Authority to Operate (ATO) prior to being operated in the VA environment, access production data, or support production users.

Table 2: Security Requirements

2.5.6. Overview of System Criticality and High Availability Requirements

High availability aspects of ASU Phase II are primarily a function of AITC data center policies. Although there are plans to maintain a backup facility, it is intended to support disaster recovery and will not enhance day-to-day operational availability.

2.5.7. Single Sign-on Requirement

None

2.5.8. Requirement for Use of Enterprise Portals

None

2.5.9. Special Device Requirements

None

None

2.6. Legacy System Retirement

None

3. Conceptual Design

None

3.1. Conceptual Application Design

None

3.1.1. Application Context

None

3.1.2. High-Level Application Design

None

3.1.3. Application Locations

None

3.2. Conceptual Data Design

3.2.1. Project Conceptual Data Model

None

3.2.2. Database Information

None

3.2.3. User Interface Data Mapping

None

3.2.3.1. Application Screen Interface

None

3.2.3.1.1. <Insert name of screen>

None

3.2.3.2. Application Report Interface

None

3.2.3.2.1. <Insert name of report>

None

3.2.3.3. Unmapped Data Element

None

3.3. Conceptual Infrastructure Design

None

3.3.1. System Criticality and High Availability

None

3.3.2. Special Technology

None

3.3.3. Technology Locations

None

3.3.4. Conceptual Infrastructure Diagram

3.3.4.1. Location of Environments and External Interfaces

None

3.3.4.2. Conceptual Production String Diagram

None

4. System Architecture

None

4.1. Hardware Architecture

None

4.2. Software Architecture

None

4.3. Network Architecture

None

4.4. Service Oriented Architecture / ESS

None

4.5. Enterprise Architecture

None

5. Data Design

None

5.1. DBMS Files

None

5.2. Non-DBMS Files

None

5.3. Data View

None

6. Detailed Design

None

6.1. Hardware Detailed Design

None

6.2. Software Detailed Design

None

6.2.1. Conceptual Design

None

6.2.1.1. Product Perspective

None

6.2.1.1.1. User Interfaces

None

6.2.1.1.2. Hardware Interfaces

None

6.2.1.1.3. Software Interfaces

None

6.2.1.1.4. Communications Interfaces

None

6.2.1.1.5. Memory Constraints

None

6.2.1.1.6. Special Operations

None

6.2.1.2. Product Features

None

6.2.1.3. User Characteristics

None

6.2.1.4. Dependencies and Constraints

None

6.2.2. Specific Requirements

6.2.2.1. Database Repository

None

6.2.2.2. System Features

None

6.2.2.3. Design Element Tables

None

6.2.2.3.1. Routines (Entry Points)

None

6.2.2.3.2. Templates

None

6.2.2.3.3. Bulletins

None

6.2.2.3.4. Data Entries Affected by the Design

None

6.2.2.3.5. Unique Record(s)

None

6.2.2.3.6. File or Global Size Changes

None

6.2.2.3.7. Mail Groups

None

6.2.2.3.8. Security Keys

None

6.2.2.3.9. Options

None

6.2.2.3.10. Protocols

None

6.2.2.3.11. Remote Procedure Call (RPC)

None

6.2.2.3.12. Constants Defined in Interface

None

6.2.2.3.13. Variables Defined in Interface

None

6.2.2.3.14. Types Defined in Interface

None

6.2.2.3.15. GUI

None

6.2.2.3.16. GUI Classes

None

6.2.2.3.17. Current Form

None

6.2.2.3.18. Modified Form

None

6.2.2.3.19. Components on Form

None

6.2.2.3.20. Events

None

6.2.2.3.21. Methods

None

6.2.2.3.22. Special References

None

6.2.2.3.23. Class Events

None

6.2.2.3.24. Class Methods

None

6.2.2.3.25. Class Properties

None

6.2.2.3.26. Uses Clause

None

6.2.2.3.27. Forms

None

6.2.2.3.28. Functions

None

6.2.2.3.29. Dialog

None

6.2.2.3.30. Help Frame

None

6.2.2.3.31. HL7 Application Parameter

None

6.2.2.3.32. HL7 Logical Link

None

6.2.2.3.33. COTS Interface

None

6.3. Network Detailed Design

None

6.4. Service Oriented Architecture / ESS Detailed Design

None

6.4.1. Service Description for <Consumed Service Name>

None

6.4.2. Service Design for <Provided Service Name>

None

6.4.2.1. Introduction

6.4.2.1.1. Purpose and Scope of Service

None

6.4.2.1.2. Links to Other Documents

None

6.4.2.2. Service Details

6.4.2.2.1. Service Identification

None

6.4.2.2.2. Service Versions

None

Version Numbers	Current Status of Version	A Brief Description of the change implemented in that version
<i>This version</i>	<i>Being Designed</i>	
<i>Example: version 2</i>	<i>Example: In production. Will be retired with this release.</i>	<i>Example: This release added the ability to look up a person by address. Provide a link to each version of the service.</i>
<i>Example: version 1</i>	<i>Example: Retired.</i>	<i>Example: This release provided the base minimum functionality to look up a person by name. Provide a link to each version of the service.</i>

6.4.2.2.3. Summary of Design and Platform Details

6.4.2.2.3.1. SOA Pattern(s) Implemented

Name of the SOA pattern implemented – for instance, this may be a Pub/Sub model. Just a name and reference to the document or book with the pattern is sufficient for popular patterns or VA's own patterns. If you are using some esoteric pattern, more details will help.

6.4.2.2.3.2. COTS Platform vendor names and versions for hosting platform

None

6.4.2.3. Dependencies

None

6.4.2.4. Service Design Details

None

6.4.2.4.1. Interface Technical Specs

None

6.4.2.4.1.1. Service Invocation Type

None

6.4.2.4.1.2. Service Interface Type

None

6.4.2.4.1.3. Service Name

None

6.4.2.4.1.4. Interface

None

6.4.2.4.1.5. End Points

None

6.4.2.4.1.6. Operations or Methods

None

6.4.2.4.1.7. Message Schemas

None

6.4.2.4.2. Information Model

None

6.4.2.4.2.1. Class Diagram and Description of Entities Involved

None

6.4.2.4.2.2. Mappings from ELDM to Standards Based Schemas

None

6.4.2.4.3. Behavior Model (AKA Use Case Realization)

None

6.4.2.4.3.1. Use Cases (Use Case Model)

None

6.4.2.4.3.2. Interaction Diagrams

None

6.4.2.5. Gap Analysis

None

6.4.2.5.1. Variances from Enterprise Target Architecture

None

6.4.2.5.2. Variances from SLDs

None

6.4.2.5.3. Variances from Standards and Policies

None

6.4.2.5.4. Justification for Exceptions and Mitigation

None

7. External System Interface Design

None

7.1. Interface Architecture

None

7.2. Interface Detailed Design

None

8. Human-Machine Interface

The user interface for the client applications leverages Windows standards for interface layout design and user controls. The applications make use of toolbars with icons for driving navigation but also support the use of text-based menus for navigation. The screens and options/functionality made available to end users is driven based upon their pre-defined role(s) within the application and therefore assists in driving workflow. Superfluous information and options are minimized through this mechanism.

8.1. Interface Design Rules

The idea of standard presentation of data for use and clarity are among the key design concepts across screens within the client applications. Consistent use of actions for navigation and workflow controls allow for ease of learning and ease of use within the client applications.

8.2. Inputs

Keyboard and mouse are the mechanisms used by end-users to provide information to the system. Some modules can be driven solely using keyboard, and these are described within the requirements matrix. The UI for some modules have been optimized for touch screen compatibility, where the use of tablets or touch screens makes sense for the clinical workflow.

Security within the system is defined via role and read vs. write across all modules/features. If a user only has read access, then mechanisms to update data are hidden or disabled.

8.3. Outputs

The standard screen layout includes a meaningful window screen title, banner or fields displaying user and patient context and a set of controls for conveying clinical documentation, typically including tables/grids, text boxes, option boxes, and labels. Toolbar and text menus allow for navigation across screens and tabs provide navigation across sections within screens. Buttons located on the bottom of screens allow the user to control updates and actions against data and workflow.

8.4. Navigation Hierarchy

None

8.4.1. Screen [x.1]

None

8.4.2. Screen [x.2]

None

8.4.3. Screen [x.3]

None

9. Security and Privacy

9.1. Security

None

9.2. Privacy

None

A. Additional Information

None

A.1. RTM

Refer to the ASU Phase II Requirements Traceability Matrix for detailed information.

A.2. Packaging and Installation

Packing and shipping are non-issues and the ASU Phase II Enhancements will use the data center infrastructure already in-place for installation.

A.3. Design Metrics

A.4. Acronym List and Glossary

Table 59: Glossary

Acronyms/ Abbreviations/Terms	Description
AITC	Austin Information Technology Center
ADT	Admit, Discharge, and Transfer
API	Application Programming Interface
ARK	Anesthesia Record Keeper
ATO	Authority to Operate
BMS	Bed Management System
CPR	CardioPulmonary Resuscitation
CL	Catheterization Labs
C&A	Certification and Accreditation
CART	Clinical Assessment Reporting & Tracking System
CIS	Clinical Information System
CCD	Continuity of Care Document
CCG	Centricity Clinical Gateway
CCOW	Clinical Context Object Workgroup
COTS	Commercial Off-The-Shelf
CMS	Centers for Medicare and Medicaid Services
CPRS	Computerized Patient Record System
EA	Enterprise Architecture
GUI	Graphical User Interface
HIPAA	Health Insurance Portability and Accountability Act
HL7	Health Level 7
HLO	Health Level 7 Optimization
HWSC	HealtheVet Web Services Client
HCIdM	Identity Management and Patient Demographics

Acronyms/ Abbreviations/Terms	Description
ICU	Intensive Care Unit
IT	Information Technology
JC	Joint Commission
MD	Medical Doctor
MDWS	Medical Domain Web Services
MVI	Master Veteran Index
NDS	Naming Directory Service
NHIN	Nationwide Health Information Network
NCA	National Cemeteries Administration
NSQIP	National Surgery Quality Improvement Program (see
OIG	Office of Inspector General
OR	Operating Room
PACU	Post Anesthesia Care Unit
PCE	Patient Care Encounter
PCP	Primary Care Physician
PCS	Patient Care Services
PII	Personally Identifiable Information
PAN	Processor Area Network
PWS	Performance Work Statement
RPC	Remote Procedure Call
RSD	Requirements Specification Document
RTLS	Real Time Locator System
RTM	Requirements Traceability Matrix
SDS	Standard Data Services
SAM	Strategic Asset Management
SQWM	Surgery Quality and Workflow Manager
TAR	Technical Analysis Review
TAS	Technical Analysis Summary
TRM	Technical Refresh Model
TWG	Technical Working Group
TIU	Text Integration Utilities
USH	Under Secretary of Health
VA	Department of Veterans Affairs
VACO	Veterans Affairs Central Office
VAMC	Veterans Affairs Medical Center
VBA	Veterans Benefits Administration
VASQIP	VA Surgical Quality Improvement Program
VHA	Veterans Health Administration
VIE	VistA Interface Engine

Acronyms/ Abbreviations/Terms	Description
VISN	Veterans Integrated Service Network
VistA	Veterans Information Systems Technology Architecture
VITAS	Veterans Implant Tracking and Alert System
VSSC	Veterans Service Support Center
WAN	Wide Area Network
WHO	World Health Organization

A.5. Required Technical Documents

The following documents must be submitted for review to support proper approval:

- Product Architecture Document
- Requirements Traceability Index
- Requirements Specification Document
- Product Build Document
- Architecture Process and Workflow Document
- Architecture Process Document

A.6. Attach Documents

Template Revision History

Date	Version	Description	Author
September 2014	2.7	Adds Enterprise Shared Services terms and requires AERB Compliance Certificate attachment.	Process Management
August 2014	2.6	Signature block update authorized by AERB CR_018934	Process Management
March 2014	2.5	Section 508 repairs to new version approved by AERB Chair approved	Process Management
August 2013	2.3	Replaced the Service Architecture sub-section with new sub-sections for consumed and provided services. Also applied miscellaneous feedback from VA team.	ASD Enterprise Shared Services (ESS) Work Group
June 2013	1.3	Upgraded to MS Office 2007-2010 format	Process Management
June 2013	1.2	Address inconsistencies in Section 3, Conceptual Design, Correct headings	Process Management
March 2013	1.1	Formatted to documentation standards and edited for Section 508 conformance	Process Management

Date	Version	Description	Author
January 2013	1.0	Initial Document	PMAS Business Office

See TOGAF® 9.1, Part III: ADM Guidelines & Techniques, Gap Analysis on TOGAF website at <http://pubs.opengroup.org/architecture/togaf9-doc/arch/chap27.html>