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WEB BASED FORENSIC INFORMATION MANAGEMENT SYSTEM

Parmjit Singh

**Thesis Submitted to
The College of Engineering and Mineral Resources
at West Virginia University
in partial fulfillment of the requirements
for the degree of**

**Master of Science
in
Industrial Engineering**

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Dr. Warren R. Myers
Captain Ted Smith**

Department of Industrial and Management Systems Engineering

**Morgantown, West Virginia
2006**

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ABSTRACT

WEB BASED FORENSIC INFORMATION MANAGEMENT SYSTEM

Parmjit Singh

The focus of this work was on the design and implementation of a web based forensic information management system for the West Virginia State Police Forensics Laboratory (WVSPFL). The software tool enables law enforcement agents to submit crime information to the Forensic Laboratory via a secure Internet connection. The tool also enables each of the nine units of WVSPFL to process the information electronically. Online electronic forms were created to mirror the existing paper based forms, making the transition easier. The existing processes were standardized and streamlined, thereby minimizing information inconsistency. The crime information once gathered is automatically uploaded to a database. It can then be viewed and queried by any authorized law enforcement officer at anytime from anywhere. The software tool was implemented in ASP.NET with MS SQL Server as the database. The key benefits of the system are streamlining of information flow, around the clock availability of case information, and sharing of information between the various law enforcement agencies.

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LIST OF ACRONYMS

ACN	Agency Case Number
AFIS	Automated Fingerprint Identification Systems
ASP	Active Server Pages
CEP	Central Evidence Processing
CER	Central Evidence Receiving
CODIS	Combined DNA Index System
CR	Case Reporting
DC	Document Checklist
FIMS	Forensic Information Management System
GC/MS	Gas Chromatograph/Mass Spectrometer
GSR	Gunshot Residue
JIS	Judicial Information Systems
LCN	Lab Case Number
LEIF	Laboratory Evidence Inventory Form
LIMS	Laboratory Information Management System
NIBIN	National Integrated Ballistics Information Network
NIJ	National Institute of Justice
ORI	ORiginating agency codes
PDA	Personal Digital Assistant
PDQ	Paint Database Query
SQL	Structured Query Language
WVSPFL	West Virginia State Police Forensics Laboratory
WWW	World Wide Web

CHAPTER 1

INTRODUCTION

1.1 Introduction to Forensics

Forensics science is the application of physical sciences to law in the search for truth in civil, criminal, and social behavioral matters to the end that injustice shall not be done to any member of society [1]. Forensic identification is a scientific technique focused on documenting, collecting, and analyzing evidence [2]. Information obtained through the scientific techniques are organized, verified, and then presented to the judicial system for determining innocence or guilt of a suspect. Some of the functions of a forensic scientist include: analysis of physical evidence, providing expert testimony, and furnishing training in the proper recognition, collection, and preservation of physical evidence [3].

1.2 Introduction to Information Management System

Information management has been defined as the organization-wide capability of creating, maintaining, retrieving, and making immediately available the right information, in the right place, at the right time, in hands of the right people, at the lowest cost, in the best media, for use in decision making [4]. An information management system deals with inputting, collating and organizing data that should provide selective information and reports to the management in order to monitor and control the project, organization, resources, activities and results [5].

The rapid evolution of computer technology is expanding man's ability to convert data into useful information and to utilize the information to solve complex problems. Information management systems are becoming of ever-greater interest in progressive and dynamic organizations. The need to obtain, access conveniently, quickly, and economically makes it imperative to devise procedures for the creation, management and utilization of databases [6].

1.3 Web based Information Management

Recent advances in web technology have made the focus of the information technology field to move towards development for the World Wide Web (WWW). More users have access to web information, and information providers are able to store information of various types on the web easily. The web has now become one of the most important medium for information interchange. Web based systems maximize information sharing and enable comprehensive management of data [7].

Information systems using the web technology are prevalent throughout the world. Applications that have emerged on intranets and internets using web technologies can be referred to as web base information management systems [8]. However, a web based information management system should be distinguished from a normal web application; a web page simply displays information to the user. A web based information management system can be defined as a system that not only provides information users but also proactively interacts with them to help in their task [9].

Web based information management systems take coordination, communication, and collaboration to a new level. One of the key assets of a web based information management systems is its ability to make large volume of data and information accessible to users in a wide variety of circumstances [10]. A web accessible device is all that is needed to view the information. Traditional information management systems focus on querying, reporting, and analyzing data related to business transactions. Web based information systems go beyond this functionality by integrating different media for knowledge representation thereby supporting not only the creation, integration, analysis, and distribution of structured information, but also the storage and transfer of knowledge. While web based systems do not conceptually differ from respective traditional systems, web-based information systems allow for more advanced forms of information management than traditional information systems [11].

Advancements in web technology have made it possible to move documentation and data management away from paper based systems. New web programming languages take advantage of high-end database technology to deliver the promise of a paperless society. A web based information management system manages and stores data in an

electronic format. Any type of record or documentation that is needed can be completed online through the web browser. Some of the benefits of operating a web-based system are [12]:

- Significant cost savings. It has been estimated that 80 to 90% of costs are associated with searching paper documents after they are created.
- Time savings as much as 15 to 30 %, because web-based systems, due to their ability to easily search for documents. It eliminates tedious monitoring and freeing employees to work on more important tasks.
- Maintaining electronic documents are easy and require less storage space.
- Reduced costs of print, copy, distribute and update paper based forms.
- Ability to collaborate and view real-time documents reduces chances of duplication.
- Worldwide access through the Internet assures that users are connecting to the system from any where at anytime.

1.4 Other Published Work

Developing a forensic information management system is a relatively new topic, and the use of web technology in for information management is even newer. An exhaustive literature review only produced two relevant works.

The first is an information technology system that is in the process of development by the Nation Institute of Justice (NIJ). The system once implemented would provide inter-regional information sharing among law enforcement agencies. The system provides access to information within a jurisdiction and provides the capability to query information sources from other agencies with appropriate privacy and security [13].

The second work was also under an NIJ contract. A Forensic Information Management System (FIMS 1.0) was developed for the West Virginia State Police Forensic Laboratory (WVSPFL), Charleston, WV. FIMS 1.0 focused on the biochemistry unit of WVSPFL [14]. The three phases of the biochemistry unit: a) Case Reporting, b) Evidence Processing and c) Evidence Amplification were implemented on the Microsoft Windows platform. Programming was done in Microsoft Visual Basic. The current work

aims to expand FIMS 1.0 to web environment and implement the system for all the functional units of the laboratory.

1.5 Problem Statement

A review of previously published work indicates that although the notion of forensic information management system has exploded, there are several concerns with existing software. These concerns include that the software is developed for windows platform and focus is on only one of the laboratory unit. There exists an unfulfilled need for a simple, streamlined, tool for information management.

It is proposed to develop a system with the use of web-based technology for management of forensic information. The goal of the project is to streamline the various processes at WVSPFL and to implement FIMS 3.0; a web based Forensic Information Management System for case submission, central evidence receiving, processing and all the units of the WVSPFL. Such a system will:

- Reduce handwritten paperwork.
- Reduce case processing time.
- Improve data reliability.
- Electronic chain of custody management.
- Enable printing of reports from remote sites.
- Provide a uniform approach to case reporting.
- Reduce case backlog.
- Eliminate duplication of work.
- Enable easy access to the system from anywhere at anytime.
- Result in case submission from remote sites.
- Result in checking of case status from remote sites.
- Result in improved communication between the various law enforcement agencies and the forensics laboratories.

1.6 FIMS System Architecture Design

One of the key elements of any application design is the system architecture. The system architecture defines how pieces of the application interact with each other, and what functionality each piece is responsible for performing. There are three main style of application architecture with each style being characterized through the number of layers between the user and the data. Each layer generally runs on a different system or in a different process space on the same system. The three types of application architecture are single-tier (or monolithic), two-tier, and n-tier, where n can be three or more.

With three-tier applications, the business rules are removed from the client and are executed on a system in between the user interface and the data storage system. The client application provides user interface for the system. The business rules server ensures that all of the business processing is done correctly. It serves as an intermediary between the client and the data storage. In this type of application, the client does not access the data storage system directly. This type of system allows for any part of the system to be modified without having to change the other two parts. Since the parts of the application communicate through interfaces, then as long as the interface remains the same, the internal workings can be changed without affecting the rest of the system [15].

- **Client Tier:** The user interface or presentation layer. Through this topmost layer, the user can input data, view the results of requests, and interact with the underlying system. On the Web, the browser performs these user interface functions. In non-Web-based applications, the client tier is a stand-alone, compiled front-end application.
- **Middle Tier:** Components that encapsulate an organization's business logic. These processing rules closely mimic everyday business tasks, and can be single-task-oriented, or part of a more elaborate series of tasks in a business workflow. In a Web application, the middle tier might consist of components registered as

part of a transactional application or instantiated by a script in Active Server Pages (ASP).

- **Third Tier:** A database management system (DBMS) such as a Microsoft® SQL Server™ database, an unstructured data store such as Microsoft® Exchange, or a transaction-processing mechanism such as Transaction Services or Message Queuing. A single application can enlist the services of one or more of these data providers.

Separating the application into layers isolates each major area of functionality. The presentation is independent of the business logic, which is separate from the data. Designing applications in this way has its tradeoffs; it requires a little more analysis and design at the start, but greatly reduces maintenance costs and increases functional flexibility. Other gains from this approach include [15]:

- **Internet ready:** Develop solutions that fully exploit the application platform's flexibility and the Internet's global reach and on-demand communication capabilities.
- **Faster time to market:** Develop and deploy solutions rapidly without requiring developer reeducation or a paradigm shift in how software is built. Expose services and functionality through the underlying "plumbing" to reduce the amount of code development.
- **True interoperability:** Build interoperability into all tiers so functionality can be added to existing systems. Adhere to open protocols and standards so other vendor solutions can be integrated.
- **Reduced complexity:** Integrate key services directly into the operating system and expose them in a unified way through the components. Reduce the need for information technology (IT) professionals to function as system integrators so they can focus on solving the business problem.
- **Language, tool, and hardware independence:** Provide a language-neutral component model so developers can use task-appropriate tools. Build on the PC

model of computing, wherein customers can deploy solutions on widely available hardware.

- **Lower the total cost of ownership:** Develop applications that are easy to deploy, manage, and change over time.

1.7 Introduction to FIMS Application

FIMS (Forensic information management system) is complete Web-based forensic data entry and reporting system deployed on the West Virginia State Police Headquarter intranet. FIMS application integrates the multiple years' laboratory case information data from multiple laboratories and agencies all over the state of West Virginia into one database. FIMS also provides online, integrated reports generation, problem tracking, and trouble reporting capability.

All forensic laboratory and agency personnel have the ability to browse the FIMS data from their respective units. User credentials are gathered from the username and password supplied on the login page FIMS application URL (<http://fims.rsa.wvu.edu/default.aspx>).

Understanding the FIMS Work Area

This section describes the modules available in the FIMS application. The details of each module are described below.

FIMS homepage

By default, the initial screen of FIMS is the home page screen as shown in Figure 1.1. The screen shows the different modules of the system. User can click on the rectangular sections to navigate to login screen of that unit.

Figure 1.1: FIMS home page

Unit homepage

The FIMS unit login screen assist in verifying user credentials. Each user must be enrolled with the system before accessing work area.

Figure 1.2: Unit home page

The header region enables the user to navigate to FIMS home page or end the current session. It also displays user's full name and current date on right hand upper corner. The side navigation bar shows the unit name, input box for username and password. After verifying user credentials content are updated according to the unit. For example, *Case submission module* users will see open new case and open existing case options after successful login. Main work area is the space in which all of the user action results are displayed. For example, if a user hits open new case hyperlink, the new case form will be displayed in this region.

CHAPTER 2

CASE SUBMISSION

2.1 Existing Case Submission Process

Case submission is the first step in evidence examination. The *Originating* (ORI) agency submits a case to the forensic laboratory via the Case Report (CR) or the Case Submission Form. The CR form is sent to the forensic laboratory along with the items of evidence either by personal delivery or by postal mail. Authorized individuals prepare the *Case Submission Form* (WVSP-53) when submitting items of evidence. Typically, the *Case Submission Form* is a self-carbon form that is to be prepared by the investigator. The original (white) and two copies (pink and canary) are submitted to the lab. The submitting officer retains a copy (goldenrod). The forensic laboratory returns a receipt copy (canary) to the submitting officer at the time a report is issued. The items of evidence received at the laboratory for examination are accepted only upon completion of the CR form. [16]

Case submission involves a series of methods to collect the evidence from the crime scene and to retrieve maximum possible information from it. At present, there are over 1000 Originating (ORI) agencies that send items for testing to the WVSPFL. The case submission process is shown in the Figure 2.1.

The case submission form has eight sections, which can be categorized into two major groups: *Reporter Information* group and *Investigation Report* group. The reporter information consists of agency information, reporting officer's personal information such as name, address, and phone number. This phase also includes the agency case number. The investigation report phase contains sections that include crime description, victim information, suspect information, evidence items and supplementary case information submitted to the forensics lab. Figure 2.2 shows the sections in the case reporting process [16].

Figure 2.1: Existing Case Submission Process

A sample case submission form is shown in Figure 2.3. The top portion of the case submission form contains the reporter information. The next part of the CR form is the investigation report. The CR form also has a supplementary case information section, which is used when a case is submitted to the drug identification unit.

Figure 2.2: Case Reporting

Forensic Laboratory Case Submission Form

DPS 53
Revised March 2004

PLEASE TYPE OR PRINT LEGIBLY

Agency Case No. _____

Submitting Agency: _____ Date: ____/____/____

Mailing Address: _____ City: _____ Zip: _____ Phone: _____

Investigator: _____ Title: _____
(Last, First, MI)

Criminal Offense: _____ Crime Date: ____/____/20____ Time: _____

Brief Description of Crime: _____

List Items Submitted:

List Section(s) and Examinations(s) Requested:

1) _____	_____
2) _____	_____
3) _____	_____
4) _____	_____
5) _____	_____
6) _____	_____
7) _____	_____
8) _____	_____

(see additional sheets if necessary)

1) Victim: _____ Race: _____ DOB: ____/____/____ SSN: ____-____-____
(Last, First, MI)

2) Victim: _____ Race: _____ DOB: ____/____/____ SSN: ____-____-____
(Last, First, MI)

1) Suspect: _____ DOB: ____/____/____ SSN: ____-____-____
(Last, First, MI)

S. I. D. No. _____ - _____ FBI No. _____ Race: _____ Sex: _____ Ht: _____ ft. _____ in. Wt: _____ lbs.

2) Suspect: _____ DOB: ____/____/____ SSN: ____-____-____
(Last, First, MI)

S. I. D. No. _____ - _____ FBI No. _____ Race: _____ Sex: _____ Ht: _____ ft. _____ in. Wt: _____ lbs.

SUPPLEMENTAL INFORMATION FOR DRUG SUBMISSIONS ONLY

COURT: ☐ Federal, ☐ State Circuit, ☐ State Magistrate

PROJECTED COURT DATE: ____/____/____

TYPE: ☐ Juvenile, ☐ Grand Jury, ☐ Preliminary Hearing, ☐ Trial

Submission of Evidence Approved By: _____, State Prosecutor or ASUA (circle one)

Phone #: _____ (signature)

FOR LABORATORY PERSONNEL USE ONLY - DO NOT WRITE IN THIS BLOCK

Received via: ☐ Evidence Locker, ☐ U.S. Mail, ☐ Certified Mail _____, ☐ Personal Delivery _____

Date: ____/____/____ _____ (Signature)

Laboratory Case No. _____ Section ID No. _____

White copy - submit with evidence
Canary copy - submit with evidence
Pink copy - retained by submitting officer

Figure 2.3: WVSP-53 Case Submission Paper Form

2.2 Re-engineering of the Case Submission Process

The re-engineered case submission process is shown in Figure 2.4. ORI is responsible for filling WVSP-53 case submission form and sending it to the laboratory with the evidence package for evidence analysis. The ORI sends evidence package to laboratory via mail or personal delivery.

Figure 2.4: Step 1: Case Submission

2.2.1 Case Submission Entity Relationship Diagram

Case submission data table are connected with each other through relations. Figure 2.6 shows relational diagram between different case submission data tables.

Figure 2.6: Case Submission Data Tables

2.2.2 Case Submission Database Tables

Each section of the case submission form has a separate database table. The case submission module stores its data in the following tables:

- Lab Case ID Information (tblLabtest)
- Officer Information (tblUserInfo)
- Crime Information (tblCaseLoginForm)
- Supplementary Case Information (tblCaseSupplementary)
- Suspect Information (tblSuspect)
- Victim Information (tblVictim)
- Package Information (tblEvidence)
- Agency Information (tblAgencyInfo)
- User Login Tracking Information (tblTrackUserLogin)

The various fields of the officer information table are shown in Table 2-1. Field LCID stores the unique lab case number. Fields LastName, FirstName, MiddleName, and Title store investigating officers last name, first name, middle name, and title respectively.

Table 2-1: Officer Information Table

tblUserInfo
UserID
AgencyID
Dept
LName
FName
MName
Title
SSNumber
JobTitle
Address
City
State
Zipcode
Phone
Race
Sex
DOB
HireDate
TitleDate

The agency information table contains agency name, agency ID, street address with county, state, and zip code of the agency and contact person's name and also phone number of the agency as shown in Table 2-2.

Table 2-2: Agency Information Table

tblAgencyInfo
AgencyID
AgencyName
Street
City
County
State
Zipcode
PhoneNumber
Notes
ContactPerson
AgencyTypeID

The various fields of the crime information table are shown in Table 2-3. Field LCID stores the unique lab case number. The other fields of the table are criminal offense, crime date, time of crime, street address with county and zip code and also brief description of crime.

Table 2-3: Crime Information Table

tblCaseDetails
LabCaseID
	UserID
	AgencyID
	Dept
	AgencycaseID
	Criminaloffense
	CrimeDate
	CrimeTime
	PlaceOfCrime
	County
	State
	Crimesdescription
	SubmitDate
	ModificationDate
	CaseStatus
	AcceptedBy
	DateAccepted
	Zip
	Country
	OldCaseNumber
	ReceivingAgencyID

The victim information table contains LCID, victim ID, victim name, date of birth, race, sex, social security number, victim address including city and zip code as shown in Table 2-4.

Table 2-4: Victim Information Table

tblVictim
LabCaseID
VictimID
LastName
FirstName
MiddleName
DOB
Race
Sex
SSN
Address
City
Zip
State
Country

The suspect information table contains LCID, suspect ID, first name, middle name, last name, date of birth, race, sex, social security number, height, weight, address including city and zip code as shown in Table 2-5.

Table 2-5: Suspect Information Table

tblSuspect
LabCaseID
SuspectID
	LastName
	FirstName
	MiddleName
	DOB
	Race
	Sex
	Height
	Weight
	Criminalhistory
	SSN
	Address
	City
	Zip
	State
	Country

The Package information table contains LCID, Evidence ID, description of the package and the examinations desired for the item as shown in Table 2-67.

Table 2-6: Package Information Table

tblPackageInventory
LabCaseID
ID
	PackageID
	Description
	ExamReq
	SealCond
	Notes
	ReceivedBy
	ReceivedDate
	ReceivedVia
	PackageStatus
	PackageItemInventorySta
	whosePossession

The supplementary information table is shown in Table 2-7. It contains the supplementary information for the drug submission cases. The main fields of the table include court, type, court date, and information of the person approving submission.

Table 2-7: Supplementary Case Information Table

tblCaseSupplementary
LabCaseID
	Court
	Type
	Projectedcourtdate
	Approvedby
	Designation
	Phone

The user login log information table contains user name, agency ID, unit name, date and time of login, and IP address of the system from which the user logged on to the FIMS case submission module as shown in Table 2-8

Table 2-8: User Login Log Information Table

tblTrackUserLogin
SerialID
UserID
AgencyID
Dept
UserMachineIP
Datelogged

2.2.3 Working with the Case Submission Module

The law enforcement agencies can complete the CR form online through the FIMS case submission module. The electronic version of the CR form is similar to the paper based form. It has the following major sections: 1) Lab case ID, 2) Officer information, 3) Crime information, 4) Victim information, 5) Suspect information, 6) Item information, 7) Supplementary information, and 8) Agency information. The case submission module can be accessed via the Internet through any browser at the web address: <http://fims.rsa.wvu.edu/ORI/Default.aspx> or by clicking on the case submission link in the main page of FIMS. Figure 2.7 shows the login page for the case submission module. Each law enforcement agency in the state of West Virginia has a unique user name and password. For security purposes, the date and time of each login, IP address from which the system was logged, agency name and ID are recorded in the database.

Figure 2.7: Case Submission Module Login Page

After a user is authenticated, the main page of case submission module is opened on the left navigation bar as shown in Figure 2.8. The page has the following navigation links:

- *New case* - To open a new lab case
- *Existing case* – To Add/Modify an already submitted case

Reporting new case

When the user selects the link to open a new case, a unique LabCaseID (LCID) is generated for the case. LCID is a ten-digit number with the first four digits corresponding to the year of case submission and the remaining six digits representing the case number submitted on the year. For example the fifth case submitted in the year 2006 would have the LCID # 2006000005. The user is redirected from the main page to the officer and crime information page.

Figure 2.8: Case Submission module Main Page

Open Existing case

List of the cases submitted in the past six months with their submission date and WVSP-53 CSF status is shown in Figure 2.9. There are two calendar popup controls on the page, which enables the user to open cases submitted during a different time period. After selecting the lab case and clicking on the “*View Case*” hyperlink, the officer and crime information page opens in the main screen as shown in Figure 2.9.

Existingcase - Microsoft Internet Explorer

Address: http://localhost/ORI/Forms/Existingcase.aspx

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Jack, Martin M
Date: 7/11/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY CASE SUBMISSION

New Case
Existing Case
Change Password

To View Cases in a Different Period Select Dates:

From Date: 1/8/2006
To Date: 7/11/2006

View Case List

Existing Case(s): [Jan 8 2006- Jul 11 2006]

Lab Case ID	Date Submitted	WVSP-53 CSF Status
2006000002	4/2/2006	Accepted View Case
2006000003	6/4/2006	Accepted View Case
2006000004	6/9/2006	Accepted View Case
2006000005	7/5/2006	Accepted View Case
2006000006	7/6/2006	Accepted View Case
2006000007	7/11/2006	waiting View Case

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Local intranet

Figure 2.9: Existing Case Opening Page

Filling officer and crime information

Case submitting officer's personal information and agency name is pulled from the database. The subject of investigation for the case can be selected from the dropdown list. Table 2.10 shows the choices that are available for the user to select the subject of investigation.

Table 2-9: Subject of Investigation

Abduction	Illegal Wire Tap	Alcohol Content	Incest
Arson	Indecent Exposure	Assault	Internal Investigation
Assault/Battery	Intimidating	Automobile Accident	Joyriding
Battery	Kidnapping	Bestiality	Killing of Animals
Boating Accident	Larceny	Bombing	Larceny-Grand
Brandishing	Leaving the Scene of an Accident	Breaking & Entering	Littering
Burglary	Lottery Examination	Check Fraud	Mail Fraud/Larceny/Tampering
Child Abuse	Missing Person	Child Neglect	Money Laundering
Civil Right Violation	Motor Vehicle Violation	Computer Crimes	Negligent Homicide/Shooting
Contributing to the Delinquency of a Minor	Obliterated Serial Number	Counterfeiting	Obstructing
Credit Card Fraud	Officer Involved Shooting	Cruelty to Animals	Parole Violation
Death	Perjury	Destruction of Property	Poisoning
Domestic Disturbance	Proficiency	Drive By Shooting	Recovered Property
Driving Violation	Robbery	Driving Under the Influence	Robbery-Armed
Drugs	Robbery-Bank	Embezzlement	Sex Crime
Entering Without Breaking	Sexual Assault	Escape	Sexual Abuse
Explosives	Shooting	Extortion	Shoplifting
False Reporting	Smuggling	False Pretense	Stalking
Firearms Violation	Stolen Property	Fleeing	Suicide
Forgery	Suspicious Activity	Forgery & Uttering	Tampering
Fraud	Tax Evasion	Gambling	Threats
Game Law Violation	Theft	Gunshot Residue	Trespassing
Harassment	Unlawful Entry	Hate Crime	Uttering
Hit and Run	Vandalism	Homicide	Wanton Endangerment
Hunting Accident	Wiretapping	Identity	Wounding
Illegal Alcohol	Others		

Figure 2.10: Officer and Crime Information Page

The links in navigation menu on the left side of the screen will now have the links:

- ***New Case*** - To open a new lab case
- ***Existing Case*** – To add/modify an already submitted case
- ***Officer & Crime Information*** – To add/modify officer details and crime information
- ***Victim Information*** – To add/modify victim information
- ***Suspect Information*** – To add/modify suspect information
- ***Package Information*** – To add/modify Package information
- ***Supplemental Information*** - To add/modify supplemental case information for drug submissions
- ***Case Report*** - To view case submission report

Victim information

The user can navigate through the pages at anytime by simply clicking on the respective links on the navigation bar. The victim information page has details regarding victim(s) of a particular case. Figure 2.11 shows the victim information page. A unique victim ID is created for each victim of a given case. The user has options to view a victim, add, edit or delete victim information. The details that can be entered for a victim are: name, date of birth, race, sex, SSN, street address with state, zip code, and country. Dropdown lists are provided for race, sex, state, and country.

Victim - Microsoft Internet Explorer

Address: http://localhost/ORI/Forms/Victim.aspx

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Jack, Martin M
Date: 7/11/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY CASE SUBMISSION

New Case
Existing Case
Officer & Crime Information
Victim Information
Suspect Information
Package Information
Supplemental Information
Case Report
Change Password

Add New Victim Delete Victim Update Changes Clear Form

Select Victim ID: 1-Green, Robert View

Case Submission Form (Part 2 of 4)

Victim Information

Lab Case ID 2006000007

Victim ID: 1

Last Name: Green First Name: Robert MI:

Sex: Male Date Of Birth (mm/dd/yyyy): 06/12/1978

Race: Hispanic SSN(XXX-XX-XXXX): 123-45-6789

Address: 304 Ken Street City: Uniontown

Zip: 45098 State: WEST VIRGINIA

County: United States

Done Local intranet

Figure 2.11: Victim Information Page

The choices for the State field in the victim information page include all US states in US along with N/A.

Suspect information

The suspect information page has details regarding suspects of a particular case and resembles the victim information page with added details like suspect's criminal history, weight, height etc. as shown in Figure 2.12. A unique suspect id is created for each suspect in a given case. The user has options to view a suspect, add, edit, or delete suspect information similar to that of the victim information page.

Suspect - Microsoft Internet Explorer

Address: http://localhost/ORI/Forms/suspect.aspx

User: Jack, Martin M
Date: 7/11/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY CASE SUBMISSION

New Case
Existing Case
Officer & Crime Information
Victim Information
Suspect Information
Package Information
Supplemental Information
Case Report
Change Password

Add New Suspect Update Changes Delete Suspect Clear Form

Select Suspect ID: 1-Brown, Mike View

Case Submission Form (Part 3 of 4)

Suspect Information

Lab Case ID 2006000007

Suspect ID : 1

Last Name: Brown First : Mike MI L

Date Of Birth (mm/dd/yyyy): 03/10/1975 Race: Hispanic

Sex: N/A SSN(XXX-XX-XXXX) : 523-45-2783

Height(ft): 5 Weight(lbs): 10

Criminal History: None

Address: 904 high Street City: Uniontown

Figure 2.12: Suspect Information Page

Package information

The package information page has details regarding the packages submitted to the laboratory for testing. The user can enter a brief description of the item and also the section/examinations required for the respective items. Similar to victim and suspect information pages, a unique id is created for each package submitted for a case. The user also has options to view a package, add, edit and delete package information. Figure 2.13 shows the package information page.

The screenshot shows a web browser window titled "Evidence - Microsoft Internet Explorer" with the address bar displaying "http://localhost/ORI/Forms/Evidence.aspx". The page is the "FORENSIC INFORMATION MANAGEMENT SYSTEM" (FIMS) interface for the "WEST VIRGINIA STATE POLICE FORENSIC LABORATORY CASE SUBMISSION".

At the top right, the user is identified as "User: Jack, Martin M" with a "Date: 7/11/2006". Navigation links for "Home" and "Log Out" are present.

The main content area includes a sidebar on the left with a menu:

- New Case
- Existing Case
- Officer & Crime Information
- Victim Information
- Suspect Information
- Package Information
- Supplemental Information
- Case Report
- Change Password

The main form area has several buttons at the top: "Add Package", "Delete Package", "Update Changes", and "Clear Form". Below these is a "Select Package ID:" dropdown menu showing "2006000007-P-1" and a "View" button.

The form is titled "Case Submission Form (Part 4 of 4)" and contains a "Package Information" section. It displays the "Lab Case ID: 2006000007" and the "Package ID: 2006000007-P-1".

The "Description:" field contains a list of items:

1. Pairs of Boots (Suspect's)
2. Pair Of Pants (Suspect's)
3. Knife (suspect's Knife)
4. Scissors (Front Porch)

The "Section(s) and Examination(s) Required:" field contains a list of required examinations:

- Blood Identification
- Finger Prints Identification
- DNA Identification

Figure 2.13: Package Information Page

Supplemental information

The supplemental information page has details regarding the projected trial date and the court. It is filled only for drug submissions. Figure 2.14 shows the supplemental information page.

Supplemental Information for Drug Submissions - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Go Links

Address http://localhost/ORI/Forms/Supplement.aspx

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Jack, Martin M
Date: 7/11/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY CASE SUBMISSION

New Case
Existing Case
Officer & Crime Information
Victim Information
Suspect Information
Package Information
Supplemental Information
Case Report
Change Password

Submit Supplemental Information **Update Changes**

Supplemental Information for Drug Submission

Lab Case ID: 2006000007 Date:

Submitting Agency: WV0020100

Court: State Circuit Projected Trial Date: 7/10/2006

Type: Grand Jury

Evidence Submission approved by: State Prosecutor

Phone:

Comments:

Done Local intranet

Figure 2.14: Supplemental Information Page

Printing and exporting DPS-53 form

After completing all of the information for a case, the various law enforcement agencies can view the case submission report. The case submission report resembles the existing form and follows the same order of reporting. The user can also print the case report by the conventional print function in the browser. All of the forms are made user-friendly with dropdown lists wherever possible. The user can view different forms through a menu structure located on the top of the screen. Changes/additions to an already submitted case can be made easily by opening the respective case. The submitted information is stored in a secure database. An electronic version of the case submission report is shown in Figure 2.15.

The screenshot shows a web browser window titled "Reports - Microsoft Internet Explorer" with the address bar displaying "http://localhost/ORI/Forms/Report.aspx". The page content is for the "FORENSIC INFORMATION MANAGEMENT SYSTEM" (FIMS). On the left, there is a sidebar for the "WEST VIRGINIA STATE POLICE FORENSIC LABORATORY CASE SUBMISSION" with a menu including "New Case", "Existing Case", "Officer & Crime Information", "Victim Information", "Suspect Information", "Package Information", "Supplemental Information", "Case Report", and "Change Password". The main content area has buttons for "Export Via PDF", "Export Via MSWORD", and "Print Report". Below these is a "Case Submission Report" header with navigation controls and a "powered by crystal" logo. The report itself is titled "Forensic Laboratory Case Submission Report (WVSP-53)" and includes the following information:

Submitting Agency and Officer Information:	
Agency Name:	MARTINSBURG POLICE DEPT.
Address:	232 NORTH QUEEN STREET
County:	BERKELEY
Lab Case ID:	2006000007
Agency Case #:	T1267-45
Submit Date:	7/11/2006 12:00:00AM
City:	MARTINSBURG
State:	WV

Figure 2.15: Case Report Page

By clicking on the Export via PDF / MS-Word button the case submission report can be exported in PDF/MS-Word format respectively. A Sample PDF report is shown in Figure 2.16.

http://localhost/ORI/Forms/Report.aspx - Microsoft Internet Explorer

Address: http://localhost/ORI/Forms/Report.aspx

Forensic Laboratory Case Submission
Case Submission Report (WVSP-53)

Lab Case ID: 2006000007
Agency Case #: T1267-45

Submitting Agency and Officer Information:

Agency Name: MARTINSBURG POLICE DEPT. Submit Date: 7/11/2006 12:00:00AM
Address: 232 NORTH QUEEN STREET City: MARTINSBURG
County: BERKELEY State: WV
Zip Code: 25401 Phone Number: 304-264-2100
Officer Last Name: Jack First Name: Martin Middle Name: M Title: Captain

Crime Information:
Criminaloffense: Wounding

1 of 2

Figure 2.16: PDF Version of Case Submission Report

http://localhost/ORI/Forms/Report.aspx - Microsoft Internet Explorer

Address: http://localhost/ORI/Forms/Report.aspx

Forensic Laboratory Case Submission
Case Submission Report (WVSP-53)

Lab Case ID: 2006000007
Agency Case #: T1267-45

Submitting Agency and Officer Information:

Agency Name: MARTINSBURG POLICE DEPT. Submit Date: 7/11/2006 12:00:00AM
Address: 232 NORTH QUEEN STREET City: MARTINSBURG
County: BERKELEY State: WV
Zip Code: 25401 Phone Number: 304-264-2100
Officer Last Name: Jack First Name: Martin Middle Name: M Title: Captain

Crime Information:
Criminaloffense: Wounding
Crime Date: 10/16/2005 Crime Time: 1332
Place Of Crime: 504 Gren Circle State: WEST VIRGINIA

Figure 2.17: MS Word Version of Case Submission Report

Change User Password

Users can change their password through this section by providing appropriate user credentials as shown in Figure 2-18.

The screenshot shows a web browser window titled "Change Password - Microsoft Internet Explorer". The address bar displays "http://localhost/ORI/Forms/Changepass.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the text "User: Jack, Martin M" and "Date: 7/11/2006". Below the header, there is a "Home | Log Out" link. The main content area is divided into two columns. The left column contains the "WEST VIRGINIA STATE POLICE" logo and the text "FORENSIC LABORATORY CASE SUBMISSION". Below this, there are links for "New Case", "Existing Case", and "Change Password". The right column contains the "Change Password" form, which includes fields for "Username" (pre-filled with "ori1"), "Old Password", "New Password", and "Re-enter new Password". A "Submit" button is located below the "Re-enter new Password" field. The status bar at the bottom of the browser window shows "Done" and "Local intranet".

Figure 2.18: Change Password Section

Exiting case submission

User can terminate the current session by clicking on logout hyperlink on the top right corner of the page.

CHAPTER 3

CENTRAL EVIDENCE RECEIVING

3.1 Existing Central Evidence Receiving Process

The Central Evidence Receiving (CER) unit is responsible for receiving form DPS-53 and packages from ORI agencies. Hand written form DPS-53 is filled by ORI agency and then packages are sent via mail or personal delivery. CER can accept/deny form DPS-53. If accepted CER inventories packages received otherwise the respective agency is informed of the reason(s) for denial. Inventoried packages are then sent to CEP.

CER receives packages from the ORI agencies via mail or personal delivery. If the items within a package are for a single unit, CER sends the packages to the appropriate unit. The analyst in the unit then inventories the items within the packages using a Laboratory Evidence Inventory Form (LEIF). If the items are for multiple units, the packages are sent to processing. The Processing unit inventories the items in the packages using a LEIF based on CR and the items received. Figure 3.1 shows a LEIF form. After inventorying the items, the items are placed in bulk storage and placed in appropriate bags/containers depending upon its size. Each item is tagged and given an item number. Photographs of the packages are also taken. The processing unit then sends items to the appropriate unit(s) for testing. Processing unit completes a new LEIF form that details the items submitted to various units. The processing places completed LEIF form and CR form in an envelope and deliver it to the appropriate unit's mailbox. The analyst then collects the items and completes a LEIF form for the respective unit. The analyst initials the LEIF form and case submission form if items and other information match on both forms. The CER maintains inventory control via LEIF forms and performs inventory check every three months. If any of the items on the LEIF does not match/exists, then CER calls the respective units to verify. CER is also responsible for the chain-of-custody management. Chain of Custody is a process to maintain and document the chronological history of the evidence [16].

[illegible][illegible]

Chain-of-custody is essential for maintaining control of the evidence from the moment it is collected till it is accepted in court. CER maintains chain-of-custody form shown in Figure 3.2. This form remains with the evidence from the time it was received to its final disposition.

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Agency: _____	Lab Case Number: _____
City: _____	Agency case number: _____
Inv. Officer: _____	Court Date: _____
Date Received: _____	Location: _____
Received VIA: _____	
Received by: _____	

Description of Evidence

☐ Box ☐ Envelope ☐ Evidence Bag ☐ HSEE
☐ Paper Bag ☐ Plastic Bag ☐ Ziploc Bag ☐ Other _____

Seal Condition: ☐ Broken ☐ Unbroken ☐ None (Sealed by: _____)

CHAIN OF CUSTODY
(Codes: A=All, P= Packaging, C= Contents)

DATE	Item	Code	FROM	Initials	TO	Initials

FINAL DISPOSITION

☐ Released Agency: _____
 Name: _____ Last _____ First _____ MI _____
 Signature: _____ Date: ____/____/____

☐ Returned via Certified Mail Tracking Number: _____
 By: _____ Date: ____/____/____
Signature

Notes: _____

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3.2 Re-engineering the Central Evidence Receiving Process

Figure 3.3 shows the evidence and information flow from ORI to CER module. The CER receives evidence package from ORI agencies via mail or personal delivery.

Figure 3.3 Information & Evidence flow

Figure 3.4 shows the evidence and information flow from Central Evidence Processing (CEP) to CER module. CER unit receives the evidence package and the final approved laboratory case report back from CEP unit and sends it back to the ORI agency.

Figure 3.4: Receive Package& Final Report from CEP

3.2.1 Central Evidence Receiving Entity Relationship Diagram

CER data table are connected with each other through relations. Figure 3.5 shows relational diagram between CER data tables.

Figure 3.5: Entity Relationship Diagram

3.2.2 Central Evidence Receiving Database Tables

The CER module stores its data in the following tables:

- Package Inventory Information (tblPackageInventory)
- Package Chain of Custody Information (tblPackagePossession)

The various fields of the Package Inventory information table are shown in Table 3-1. This table stores package inventory information. Package seal condition, notes, received by, date received, inventory status and custody.

Table 3-1: Package Inventory Table

tblPackageInventory	
⚙	LabCaseID
⚙	ID
	PackageID
	Description
	ExamReq
	SealCond
	Notes
	ReceivedBy
	ReceivedDate
	ReceivedVia
	PackageStatus
	PackageItemInventoryStatus
	whosePossession

The various fields of the Package chain of custody information table are shown in Table 3-2. Package chain of custody is tracked by the information stored in tblPackagePossession. Package sent by, sent to, dept by, dept to with its respective date and time is stored.

Table 3-2: Package chain of custody Table

tblPackagePossession	
⚙	SerialID
⚙	LabCaseID
⚙	packageID
	sentByUserID
	datesent
	sentDepartment
	toDepartment
	receivedByUserID
	datereceived
	PackageTransStatus

3.2.3 Working with Central Evidence Receiving

CER unit home page requires username and password to verify user credentials, as shown in the Figure 3.6. After verifying credentials, a user is directed to list of cases submitted by the ORI agencies.

Figure 3.6: CER Home Page

Figure 3.7 shows the list of cases submitted. Users can search for the desired case and view case information by clicking on view hyperlink.

The screenshot shows a web browser window titled "WaitingCases - Microsoft Internet Explorer". The address bar displays "http://localhost/CERUnit/Forms/WaitingCases.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Smith, Bill L" and "Date: 7/11/2006". There are links for "Home" and "Log Out".

The main content area is divided into two sections. The left section, titled "WEST VIRGINIA STATE POLICE FORENSIC LABORATORY CENTRAL EVIDENCE RECEIVING", contains a logo and links for "Open Existing Case" and "Change Password". The right section, titled "List of Electronic Case Submission Requests", displays a table of cases.

Lab Case ID	Agency Name	Date Submitted	WVSP-53 CSF Status		
2006000002	MARTINSBURG POLICE DEPT.	4/2/2006	Accepted	View Case	Package List
2006000003	MARTINSBURG POLICE DEPT.	6/4/2006	Accepted	View Case	Package List
2006000004	MARTINSBURG POLICE DEPT.	6/9/2006	Accepted	View Case	Package List
2006000005	MARTINSBURG POLICE DEPT.	7/5/2006	Accepted	View Case	Package List
2006000006	MARTINSBURG POLICE DEPT.	7/6/2006	Accepted	View Case	Package List
2006000007	MARTINSBURG POLICE DEPT.	7/11/2006	Accepted	View Case	Package List

The footer of the page indicates "©2006 Rashpal S. Ahluwalia, West Virginia University" and "Local intranet".

Figure 3.7: List of cases submitted

Users can perform two kinds of operations from this section i.e. update case status and package inventory. This section is used to update the case status. Initially case status is set to “waiting” by default. Users can change the status to “accepted” or “denied” through this section, as shown in Figure 3.8.

CERCaseReceiveal - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Go Links

Address http://localhost/CERUnit/Forms/CERCaseReceiveal.aspx

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Smith, Bill L
Date: 7/11/2006
Home | Log Out

WEST VIRGINIA STATE POLICE

**FORENSIC LABORATORY
CENTRAL EVIDENCE RECEIVING**

Open Existing Case
Case Receiving
CER Package Inventory
Chain Of Custody
Send Package(s)
Receive Package(s)
Change Password

Case Receiving Section

Case Information

Lab Case ID: 2006000007
Agency Case ID: T1267-45
Agency Name: MARTINSBURG POLICE DEPT.
Investigation Officer: James, Bill
Date Submitted : 7/11/2006 12:00:00 AM

Status Information

Case Status: --Choose Case Status--
Received by:
Date Accepted: Not Yet Accepted

Submit

©2006 Rashpal S. Ahluwalia, West Virginia University

Done Local intranet

Figure 3.8: Case receiving form

Package Inventory

Users can inventory packages received using this section. It displays the list of packages expected for that case and respective inventory status. Receive package section can be accessed by clicking on “*Change Status*” hyperlink as shown in Figure 3.9.

The screenshot shows a web browser window titled "CER Package Inventory - Microsoft Internet Explorer". The address bar shows "http://localhost/CERUnit/Forms/CERPackageInventory.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Smith, Bill" and "Date: 7/11/2006". A sidebar on the left lists navigation options: "Open Existing Case", "Case Receiving", "CER Package Inventory", "Chain Of Custody", "Send Package(s)", "Receive Package(s)", and "Change Password". The main content area displays a "List of Packages for Lab Case ID : 2006000007". The table below shows the details of two packages.

S#	Package ID	Description	Examination Requested	Package Status
1	2006000007-P-1	1. Pairs of Boots (Suspect's) 2. Pair Of Pants (Suspect's) 3. Knife (suspect's Knife) 4. Scissors (Front	Blood Identification Finger Prints Identification Drug Identification Tool Mark Identification	Received Change Status
2	2006000007-P-2	1. Screw Driver (Suspect's Car) 2. Hammer (Iron) 3. Iron Rod (Suspect's car) 4. White Powder (Suspect's Car and	Blood Identification Finger Prints Identification Drug Identification Tool Mark Identification	not Received Change Status

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Figure 3.9: Package list

This section enables users to inventory packages by changing their respective acceptance status. Received via, seal condition and package status dropdown list enable users to make appropriate choice. Additional notes can be attached with a package by filling notes text box on the bottom of the page, as shown in the Figure 3.10.

FORENSIC INFORMATION MANAGEMENT SYSTEM
FIMS

User: Smith, Bill L
Date: 7/11/2006
Home | Log Out

WEST VIRGINIA STATE POLICE
FORENSIC LABORATORY
CENTRAL EVIDENCE RECEIVING

Open Existing Case
Case Receiving
CER Package Inventory
Chain Of Custody
Send Package(s)
Receive Package(s)
Change Password

<< Back

CER Package Inventory Form

Lab Case ID: 2006000007
Package ID: 2006000007-P-2
Received by:
Received Date:
Received via: --Choose ReceivedVia--
Description: 1. Screw Driver (Suspect's Car) 2. Hammer (Iron) 3. Iron Rod (Suspect's car) 4. White Powder (Suspect's Car and Garage)
Examination Required: Blood Identification Finger Prints Identification Drug Identification Tool Mark Identification
Seal Condition: --Choose Seal Conditon--
Package Status: --Choose Package Status--
Notes:
Update Package Information

©2006 Rashool S. Ahluwalia, West Virginia University
Local intranet

Figure 3.10: Package Inventory form

Chain of Custody

Maintaining chain of custody of the evidence packages/items is integral part of the system. Users can view chain of custody of the packages by clicking on “*Chain of Custody*” hyperlink in the side navigation bar, as shown in Figure 3.11. Chain of custody tracks transfer of packages/items between units and associates time stamp with each transfer.

The screenshot shows a web browser window titled "Chainofcustody - Microsoft Internet Explorer". The address bar shows "http://localhost/CERUnit/Forms/Chainofcustody.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Smith, Bill L" and "Date: 7/11/2006". There are links for "Home" and "Log Out".

The main content area is divided into two sections. On the left is a sidebar for "WEST VIRGINIA STATE POLICE" with the "FORENSIC LABORATORY CENTRAL EVIDENCE RECEIVING" logo and a list of navigation links: "Open Existing Case", "Case Receiving", "CER Package Inventory", "Chain Of Custody", "Send Package(s)", "Receive Package(s)", and "Change Password".

On the right is the "Chain Of Custody:" table, which displays the following data:

Package ID	Sent Dept	Sent By	Date Sent	To Dept	Received By	Date Received	Status
2006000007-P-1	Central Evidence Receiving	cer	7/11/2006 8:27:49 PM	Central Evidence Processing			Not Received
2006000007-P-2	Central Evidence Receiving	cer	7/11/2006 8:27:52 PM	Central Evidence Processing			Not Received

At the bottom of the page, there is a copyright notice: "©2006 Rashpal S. Ahluwalia, West Virginia University".

Figure 3.11: Chain Of Custody

Send Package

Users can transfer packages from one unit to another by using the “*Send Package*” hyperlink. List of packages that are accepted is available through a dropdown list, as shown in Figure 3.12. Users can select one package at a time and click “*Send*” hyperlink to initiate the process of package transfer. It is a two step process, requesting package pickup by source unit and actual package pickup by the destination unit. This process is complete when the destination unit collects the package form the source unit.

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Smith, Bill L
Date: 7/11/2006
[Home](#) | [Log Out](#)

WEST VIRGINIA STATE POLICE

**FORENSIC LABORATORY
CENTRAL EVIDENCE RECEIVING**

Open Existing Case
Case Receiving
CER Package Inventory
Chain Of Custody
Send Package(s)
Receive Package(s)
Change Password

Send Package(s)				
	Package ID	Sent By	To Dept	Sent Request Date
Delete	2006000007-P-1	cer	Central Evidence Processing	7/11/2006 8:27:49 PM
Delete	2006000007-P-2	cer	Central Evidence Processing	7/11/2006 8:27:52 PM
Send	2006000007-P-1		Central Evidence Processing	

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Local intranet

Figure 3.12: Send Package Form

Receive Package

This is opposite of send package process. Users can collect package from the source unit through this section, as shown in Figure 3.13. Once user collects a package and click on “*Receive*” button the transfer process is complete and package custody information in the database is updated.

The screenshot shows a web browser window titled "ReceiveItem - Microsoft Internet Explorer" with the address bar displaying "http://localhost/CERUnit/Forms/ReceiveItem.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Smith, Bill L" and "Date: 7/11/2006". There are links for "Home" and "Log Out".

The main content area is divided into two sections. The left section, titled "WEST VIRGINIA STATE POLICE", features the state police logo and the text "FORENSIC LABORATORY CENTRAL EVIDENCE RECEIVING". Below this, a list of menu items is displayed: "Open Existing Case", "Case Receiving", "CER Package Inventory", "Chain Of Custody", "Send Package(s)", "Receive Package(s)", and "Change Password".

The right section, titled "Receive Package(s)", contains a table with the following headers: "Package ID", "Sent By", "From Dept", and "Sent Request Date". The table body is currently empty.

At the bottom of the page, the copyright notice "©2006 Rashpal S. Ahluwalia, West Virginia University" is visible, along with a "Done" button and a "Local intranet" icon.

Figure 3.13: Receive Package Form

Change User Password

User can change password through this section by providing appropriate user credentials as shown in Figure 3.14.

The screenshot shows a web browser window titled "Change Password - Microsoft Internet Explorer". The address bar displays "http://localhost/CERUnit/Forms/Changepass.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the text "User: Smith, Bill L. Date: 7/11/2006". Below the header, there are links for "Home" and "Log Out". The main content area is divided into two columns. The left column contains the "WEST VIRGINIA STATE POLICE" logo and the text "FORENSIC LABORATORY CENTRAL EVIDENCE RECEIVING". Below this, there are links for "Open Existing Case" and "Change Password". The right column contains the "Change Password" form, which includes fields for "Username:" (pre-filled with "cer"), "Old Password:", "New Password:", and "Re-enter new Password:". A "Submit" button is located at the bottom of the form. The footer of the page displays "©2006 Rashpal S. Ahluwalia, West Virginia University" and "Local intranet".

Figure 3.14: Change Password Section

Exiting Central Evidence Receiving

Users can terminate the current session by clicking on “*Log Out*” hyperlink on the top right corner of the page.

CHAPTER 4

CENTRAL EVIDENCE PROCESSING

4.1 Central Evidence Processing Process

Central Evidence Processing (CEP) unit was recently created by splitting the CER unit into two parts i.e. CER and CEP. An independent CEP unit enables better control of the existing evidence and information flow between different units. CEP receives packages from the CER unit for further processing. Evidence and information flow from CER to CEP module is show in Figure 4.1.

Figure 4.1: Step3-Evidence & Information flow

CEP is responsible for item inventory and distribution of evidence items among different units. After receiving package from the CER unit, CEP unit is responsible for

4.1.1 Central Evidence Processing Entity Relationship Diagram

CEP data tables are connected with each other through relations as shown in the figure 4.3.

Figure 4.3: Entity relationship diagram

4.1.2 Central Evidence Processing Database Tables

The CEP module stores its data in the following tables:

- Item possession
- Item inventory
- Package inventory
- Package possession

Item chain of custody information is maintained in item possession table as shown in Table 4-1.

Table 4-1: Item Possession Table

tblItemPossession
SerialID
LabCaseID
ItemID
SentByUserID
DateSent
SentDepartment
ToDepartment
ReceivedByUserID
DateReceived
ItemTransStatus

Package inventory is maintained in package inventory table as shown in Table 4-2

Table 4-2: Package Inventory Table

tblPackageInventory
LabCaseID
ID
PackageID
Description
ExamReq
SealCond
Notes
ReceivedBy
ReceivedDate
ReceivedVia
PackageStatus
PackageItemInventoryStatus
whosePossession

Item inventory data is maintained in item inventory table as shown in Table 4-3

Table 4-3: Item Inventory Table

tblItemInventory
LabCaseID
PackageID
ID
	ItemID
	ItemName
	ItemDescription
	ItemExamReq
	ItemInventoryBy
	ItemInventoryDate
	ItemStatus
	whosePossession
	completlyConsumed

Package possession data is maintained in package possession table as shown in Table 4-4

Table 4-4: Package Possession Table

tblPackagePossession
SerialID
LabCaseID
packageID
	sentByUserID
	datesent
	sentDepartment
	toDepartment
	receivedByUserID
	datereceived
	PackageTransStatus

4.1.3 Working with Central Evidence Processing

CEP home page requires username and password to verify user credentials, as shown in the Figure 4.4. After verifying credentials, a user is directed to list of items assigned to him/her for further processing.

Figure 4.4: CEP Home Page

Figure 4.5 shows the list of cases accepted by CER unit for further processing. CEP can view the list of packages for each case by clicking on “*Package List*” hyperlink. This section also enables users to check case status. They can also view case details by clicking on “*Case Details*” hyperlink. Once a case is selected, FIMS remembers the case selected and all other information related to that case can be accessed by navigating to different sections of the application.

FORENSIC INFORMATION MANAGEMENT SYSTEM
User: Shah, James M
Date: 7/11/2006
Home | Log Out

WEST VIRGINIA STATE POLICE
FORENSIC LABORATORY
CENTRAL EVIDENCE PROCESSING

Labcase Number List
Change Password

Lab Case ID	Agency Name	Date Submitted	Case Status	Case Details	Package List
2006000002	MARTINSBURG POLICE DEPT.	4/2/2006	Accepted	Case Details	Package List
2006000003	MARTINSBURG POLICE DEPT.	6/4/2006	Accepted	Case Details	Package List
2006000004	MARTINSBURG POLICE DEPT.	6/9/2006	Accepted	Case Details	Package List
2006000005	MARTINSBURG POLICE DEPT.	7/5/2006	Accepted	Case Details	Package List
2006000006	MARTINSBURG POLICE DEPT.	7/6/2006	Accepted	Case Details	Package List
2006000007	MARTINSBURG POLICE DEPT.	7/11/2006	Accepted	Case Details	Package List

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Figure 4.5: Accepted Case List

Figure 4.6 shows case details, such as case status, received by, and date accepted. Users can search this section by clicking on “*Case Details*” hyperlink as shown in figure 4.6

Figure 4.6: Case Details section

Package Item Inventory

Figure 4.7 shows the list of packages with their description, examination requested, and item inventory status respectively. User can also check/alter item inventory status by clicking on “*Inventory List*” hyperlink.

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Shah, James M
Date: 7/11/2006
[Home](#) | [Log Out](#)

WEST VIRGINIA STATE POLICE

**FORENSIC LABORATORY
CENTRAL EVIDENCE PROCESSING**

LabCase Number List
Package List
Chain Of Custody
Send Package(s)/Item(s)
Receive Package(s)/Item(s)
Change Password

[<< Back](#)

List of Packages for Labcase Number: 2006000007

S#	Package ID	Description	Examination Requested	Item Inventory Status
1	2006000007-P-1	1. Pairs of Boots (Suspect's) 2. Pair Of Pants (Suspect's) 3. Knife (suspect's Knife) 4. Scissors (Front	Blood Identification Finger Prints Identification Drug Identification Tool Mark Identification	Inventory Done Inventory List
2	2006000007-P-2	1. Screw Driver (Suspect's Car) 2. Hammer (Iron) 3. Iron Rod (Suspect's car) 4. White Powder (Suspect's Car and	Blood Identification Finger Prints Identification Drug Identification Tool Mark Identification	Inventory Pending Inventory List

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Done Local intranet

Figure 4.7: Package List Section

After receiving package, CEP is responsible for filling laboratory item inventory form. Figure 4.8 shows the laboratory item inventory form. This section enables a user to add, update, or delete existing items. After inventorying all items in the package, CEP users need to click on “*Item Inventory Complete*” command button to finish the inventory process.

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Shah, James M
Date: 7/11/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

**FORENSIC LABORATORY
CENTRAL EVIDENCE PROCESSING**

Lab Case Number List
Package List
Chain Of Custody
Send Package(s)/Item(s)
Receive Package(s)/Item(s)
Change Password

<< Back

Package Item Inventory Status : Inventory Pending

Laboratory Item Inventory Form

Lab Case #: 2006000007

Package ID : 2006000007-P-2

List of Items :

Edit	S#	Item ID	Item Name	Item Description	Examination Required
Delete Edit	1	2006000007-P-2-I-1	Screw Driver	Screw Driver (Suspect's Car)	Blood Identification
Delete Edit	2	2006000007-P-2-I-2	Hammer	Hammer (Iron)	Tool Mark Identification
Delete Edit	3	2006000007-P-2-I-3	Iron Rod	Iron Rod (Suspect's car)	Finger Prints Identification
Delete Edit	4	2006000007-P-2-I-4	White Powder	White Powder (Suspect's Car and Garage)	Drug Identification

Add Item

Note: Please Use this option only when the Package Item Inventory is complete

Package Item Inventory Status: **Item Inventory Complete**

Figure 4.8: LEIF Form

Chain of Custody

Package and item chain of custody information is shown in Figure 4.9. The top section shows the package chain of custody, and the bottom section shows the item chain of custody.

Chainofcustody - Microsoft Internet Explorer

Address: <http://localhost/Process/Forms/Chainofcustody.aspx>

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Shah, James M
Date: 7/11/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY
CENTRAL EVIDENCE PROCESSING

LabCase Number List
Package List
Chain Of Custody
Send Package(s)/Item(s)
Receive Package(s)/Item(s)
Change Password

Labcase Number: 2006000007

Package(s) Chain of Custody

Package ID	Sent Unit	Sent By	Date Sent	To Unit	Received By	Date Received	Status
2006000007-P-1	Central Evidence Receiving	cer	7/11/2006 8:27:49 PM	Central Evidence Processing	pss	7/11/2006 8:39:07 PM	Received
2006000007-P-2	Central Evidence Receiving	cer	7/11/2006 8:27:52 PM	Central Evidence Processing	pss	7/11/2006 8:39:08 PM	Received

Item(s) Chain of Custody

Item ID	Sent Unit	Sent By	Date Sent	To Unit	Received By	Date Received	Status
2006000007-P-1-1-1	Central Evidence Processing	pss	7/11/2006 9:06:49 PM	Biochemistry			Not Received
2006000007-P-1-1-2	Central Evidence Processing	pss	7/11/2006 9:06:52 PM	Latent Prints Identification			Not Received
2006000007-P-1-1-3	Central Evidence Processing	pss	7/11/2006 9:10:25 PM	Firearms/Toolmarks Identification			Not Received
2006000007-P-1-1-4	Central Evidence Processing	pss	7/11/2006 9:10:28 PM	Drug Identification			Not Received

Figure 4.9: Chain of Custody Form

Send Package/Item

This section describes how to send package/item from source to destination units. CEP user can send package by selecting the appropriate package number from the dropdown list under **Send Package(s)** section and then clicking on “Send” hyperlink as shown in Figure 4.10.

After item inventory completion, the CEP unit has custody of the items till they are assigned to an analyst. Laboratory administration unit is responsible for tracking and assigning items to the analysts in testing units. The CEP user can view the list of item assigned and then sends those items to their relevant unit through this section as shown in the Figure 4.10.

WEST VIRGINIA STATE POLICE
FORENSIC LABORATORY
CENTRAL EVIDENCE PROCESSING

LabCase Number List
Package List
Chain Of Custody
Send Package(s)/Item(s)
Receive Package(s)/Item(s)
Change Password

Labcase Number: 2006000007

Send Package(s)

Delete	Package ID	Sent By	To Unit	Sent Request Date
Send	2006000007-P-1		Central Evidence Receiving	

Send Item(s)

Delete	Item ID	Sent By	To Unit	Sent Request Date
Delete	2006000007-P-1-I-1	pss	Biochemistry	7/11/2006 9:06:49 PM
Delete	2006000007-P-1-I-2	pss	Latent Prints Identification	7/11/2006 9:06:52 PM
Send	2006000007-P-1-I-1			

List of Items Assigned

Item ID	Unit Assigned	Date Assigned	Item Job Status
2006000007-P-1-I-1	Biochemistry	7/11/2006 8:49:08 PM	Job Pending
2006000007-P-1-I-2	Latent Prints Identification	7/11/2006 8:50:18 PM	Job Pending
2006000007-P-1-I-3	Firearms/Toolmarks Identification	7/11/2006 9:01:58 PM	Job Pending
2006000007-P-1-I-4	Drug Identification	7/11/2006 9:02:18 PM	Job Pending

Figure 4.10: Send Package/Item Section

Receive Package/Item

Once an item is sent by a source unit, then the destination unit is responsible for receiving it by clicking on “*Receive*” command button under receive package/item section as shown in Figure 4.11. This completes the handshaking protocol of item/package transfer.

ReceiveItem - Microsoft Internet Explorer

Address: http://localhost/Process/Forms/ReceiveItem.aspx

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Shah, James M
Date: 7/11/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY
CENTRAL EVIDENCE PROCESSING

LabCase Number List
Package List
Chain Of Custody
Send Package(s)/Item(s)
Receive Package(s)/Item(s)
Change Password

Labcase Number: 2006000007

Receive Package(s):

Package ID	Sent By	From Unit	Sent Request Date	
2006000007-P-1	cer	Central Evidence Receiving	7/11/2006 8:27:49 PM	Receive
2006000007-P-2	cer	Central Evidence Receiving	7/11/2006 8:27:52 PM	Receive

Receive Item(s):

Item ID	Sent By	From Unit	Sent Request Date
---------	---------	-----------	-------------------

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Local intranet

Figure 4.11: Receive Package/Item Section

Change User Password

User can change password through this section by providing appropriate user credentials as shown in Figure 4.12.

The screenshot shows a web browser window titled "Change Password - Microsoft Internet Explorer". The address bar displays "http://localhost/Process/Forms/Changepass.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Shah, James M" and "Date: 7/11/2006". There are links for "Home" and "Log Out". The main content area is divided into two columns. The left column contains the "WEST VIRGINIA STATE POLICE" logo, the text "FORENSIC LABORATORY CENTRAL EVIDENCE PROCESSING", and links for "Labcase Number List" and "Change Password". The right column contains a "Change Password" form with fields for "Username" (pre-filled with "pss"), "Old Password", "New Password", and "Re-enter new Password", followed by a "Submit" button. The footer of the page shows the copyright notice "©2006 Rashpal S. Ahluwalia, West Virginia University" and the status "Local intranet".

Figure 4.12: Change Password Section

Exiting Central Evidence Processing

Users can terminate the current session by clicking on “*Log Out*” hyperlink on the top right corner of the page.

CHAPTER 5

LABORATORY ADMINISTRATION

5.1 Laboratory Administration Process

The Administration module is responsible for meeting the many administrative, managerial, and technology needs of the laboratory. The primary goal of the laboratory administration is to provide a quality, operational work environment that supports the necessary work of forensic personnel. The section also serves as liaison to state, local, and federal agencies. Reviews and evaluates analyses and examinations performed in the laboratory. It is responsible for coordinating interagency and interdepartmental activities involving laboratory operations. It also oversees the preparation and maintenance of laboratory records and reports. It instructs law enforcement personnel in the proper laboratory procedures of identifying, handling, and examining of physical evidence. It assists in the planning of laboratory facility, equipment, staffing, and training to meet the day to day needs of the laboratory.

FIMS laboratory administration module is responsible for assigning the inventoried items to analyst in testing unit. Laboratory administration information flow diagram is shown in Figure 5.1. It is also responsible for verifying and approving the final laboratory case report, as shown in Figure 5.2.

Figure 5.1: Step 4- Information flow diagram

Figure 5.2: Step 12- Information flow diagram

5.1.1 Laboratory Administration Entity Relationship Diagram

Laboratory administration data tables are connected with each other through relations as shown in the figure 5.3.

Figure 5.3: Laboratory administration data tables

5.1.2 Laboratory Administration Database Tables

The laboratory administration unit module stores its data in the following tables

- Error Record Table(tblErrorRecord)
- Agency Information Table (tblAgencyInfo)
- Job Scheduling Table (tblJobScheduling)
- Login Table(tblLogin)
- Track User Login Table (tblTrackUserLogin)
- User Information Table (tblUserInfo)

The various fields of the error record table are shown in Table 5-1. Error record data is stored in error record table (tblErrorRecord)

Table 5-1: Error Record Table

tblErrorRecord
ID
	ErrorCode
	ErrorDesc
	Dept
	DateOccured
	Status

The various fields of the agency information table are shown in Table 5-2. agency data is stored in Agency Information table(tblAgencyInfo)

Table 5-2: Agency Information Table

tblAgencyInfo
AgencyID
	AgencyName
	Street
	City
	County
	State
	Zipcode
	PhoneNumber
	Notes
	ContactPerson
	AgencyTypeID

The various fields of the job scheduling table are shown in Table 5-3. Job assigned data is stored in job scheduling table (tblJobScheduling)

Table 5-3: Job Scheduling Table

tblJobScheduling
SNo
LabCaseID
ItemID
UserID
AgencyID
Dept
AssignDate
CompletionDate
ItemJobStatus
IsValid

The various fields of the login table are shown in Table 5-4. Login data is stored in error record table (tblLogin)

Table 5-4: Login Table

tblLogin
UserID
PasswordHash
salt
AgencyID
DateCreated
DateBlocked
Status
Dept

The various fields of the track user login table are shown in Table 5-5. Tracking data is stored in track user login table (tblTrackUserLogin)

Table 5-5: Track User Login Table

tblTrackUserLogin
SerialID
UserID
AgencyID
Dept
UserMachineIP
Datelogged

The various fields of the user information table are shown in Table 5-6. User data is stored in user information table (tblUserInfo)

Table 5-6: User Information Table

tblUserInfo
UserID
	AgencyID
	Dept
	LName
	FName
	MName
	Title
	SSNumber
	JobTitle
	Address
	City
	State
	Zipcode
	Phone
	Race
	Sex
	DOB
	HireDate
	TitleDate

5.1.3 Working with Laboratory Administration

Laboratory administration unit home page requires username and password to verify administrator credentials, as shown in the Figure 5.4. After verifying credentials, administrator is directed to FIMS administration work area as shown in the Figure 5.5.

Figure 5.4: Laboratory administration login page

FIMS laboratory administration work area enables administrator to handle a wide variety of administrative and operational issues in forensic laboratories. Side navigation bar allows navigating to the following sections:

- Laboratory Case Management
- User Management
- Agency Management
- Log Management
- System Settings
- System Statistics

Figure 5.5: FIMS Administration Work Area

Laboratory Case Management

FIMS laboratory case management module plays a critical role in managing the evidence handling and analysis process between CEP and testing units. List of cases accepted can be accessed by clicking on “*LabCase Management*” hyperlink, as shown in Figure 5.6. Administrator can access the list of packages belonging to a particular case by clicking on “*Package List*” hyperlink.

The screenshot shows a web browser window titled "LabcaseMgmt - Microsoft Internet Explorer". The address bar displays "http://localhost/Admin/Forms/LabcaseMgmt.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the text "User:Guest Date:7/11/2006". A navigation menu on the left lists: "WEST VIRGINIA STATE POLICE", "FORENSIC LABORATORY", "LABORATORY ADMINISTRATION", "LabCase Management", "Users Management", "Agency Management", "Log Management", "System Options", "System Statistics", and "Change Password". The main content area is titled "List of Cases Accepted" and contains a table with the following data:

Lab Case ID	Agency Name	Date Submitted	Case Status	
2006000002	MARTINSBURG POLICE DEPT.	4/2/2006	Accepted	Package List
2006000003	MARTINSBURG POLICE DEPT.	6/4/2006	Accepted	Package List
2006000004	MARTINSBURG POLICE DEPT.	6/9/2006	Accepted	Package List
2006000005	MARTINSBURG POLICE DEPT.	7/5/2006	Accepted	Package List
2006000006	MARTINSBURG POLICE DEPT.	7/6/2006	Accepted	Package List
2006000007	MARTINSBURG POLICE DEPT.	7/11/2006	Accepted	Package List

The table is flanked by the number "1" on both the top and bottom right. The browser's status bar at the bottom indicates "Local intranet".

Figure 5.6: List of Accepted Cases

This section lists all of the packages with their description, examination requested, package status and item inventory status, belonging to that particular case. Administrator can view the entire list of items in a package by clicking on “*List*” hyperlink as shown in Figure 5.7.

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Guest
Date: 7/11/2006
Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY ADMINISTRATION

LabCase Management
Users Management
Agency Management
Log Management
System Options
System Statistics
Change Password

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List of Packages for Labcase Number 2006000007

S#	Package ID	Description	Examination Requested	Package Status	Item Inventory Status	
1	2006000007-P-1	1. Pairs of Boots (Suspect's) 2. Pair Of Pants (Suspect's) 3. Knife (suspect's Knife) 4. Screw Driver (Suspect's Car)	Blood Identification Finger Prints Identification Drug Identification Tool Mark Identification	Received	Inventory Done	List
2	2006000007-P-2	1. Screw Driver (Suspect's Car) 2. Hammer (Iron) 3. Iron Rod (Suspect's car) 4. White Powder (Suspect's Car)	Blood Identification Finger Prints Identification Drug Identification Tool Mark Identification	Received	Inventory Done	List

Done Local intranet

Figure 5.7: List of Packages

This section enables administrator to add, update, or delete existing items. This section also enables an administrator to assign items to analyst with appropriate qualification and training in any of the testing units, by clicking on “Assign” hyperlink as shown in the Figure 5.8.

PackageItemInventory - Microsoft Internet Explorer

Address: <http://localhost/Admin/Forms/PackageItemInventory.aspx?PID=1&PTIS=Inventory%20Done>

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Guest
Date: 7/11/2006
Home | Log Out

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LABORATORY ADMINISTRATION

LabCase Management
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Package Item Inventory Status : Inventory Done

Laboratory Item Inventory Form

Lab Case ID : 2006000007
Package ID : 2006000007-P-1

List of Items

Edit	Item ID	Item Name	Item Description	Examination Required	Assign Status
Delete Edit	1	Pairs of Boots	Pairs of Boots (Suspect's)	Blood Identification	Test Inprocess Assign
Delete Edit	2	Pair Of Pants	Pair Of Pants (Suspect's)	Finger Prints Identification	Test Pending Assign
Delete Edit	3	Knife	Knife (suspect's Knife)	Tool Mark Identification	Test Pending Assign
Delete Edit	4	Scissors	Scissors (Front Porch)	Drug Identification	Test Pending Assign

Add Item

Note: Only Administrators has the power to edit or Delete existing Items once Package Item Inventory

Local intranet

Figure 5.8: List of Items

This section allows administrator to assign an item to analyst in any of the testing units, by choosing unit name from unit dropdown. When the selection in the unit dropdown is changed the list of analyst drop down is refilled with name and user ID of the available analysts in that unit. When an analyst is selected from the list, the total items pending for that analyst is displayed. This helps in load balancing among analysts in the same unit. The decision of choosing a analyst for testing an item is manual. After the analyst is selected, administrator is required to press “Assign Item” button to complete the process, as shown in Figure 5.9.

Figure 5.9: Assign Item Section

The administrator can also cancel assigned item work order and reassign it. The items already assigned to a analyst can not be reassigned till the previous assigned work order is dismissed by clicking on “*Cancel Item*” command button as shown in Figure 5.10.

The screenshot shows a web browser window titled "AssignItemToAnalyst - Microsoft Internet Explorer". The address bar shows the URL: `http://localhost/Admin/Forms/AssignItemToAnalyst.aspx?PID=2006000007-P-1-1-2`. The page content is divided into a left sidebar and a main content area.

Left Sidebar: FORENSIC LABORATORY LABORATORY ADMINISTRATION

- LabCase Management
- Users Management
- Agency Management
- Log Management
- System Options
- System Statistics
- Change Password

Main Content Area:

Item Name : Pair Of Pants

Items Description : Pair Of Pants (Suspect's)

Examination Required : Finger Prints Identification

Item Assigned to Analyst(s):

Analyst ID:	LAT1
Analyst Dept :	19
Date Assigned:	7/11/2006 8:50:18 PM

Item Status: Test Inprocess

Assign Item to the Analyst :

Note! This buttun is only used in case assigned task is to be aborted.

Cancel Item Assigned:

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Figure 5.10: Cancel Item Option

User Management

User management section enables administrator to view, add, delete, or disable FIMS users. User management section allows navigating to the following sections:

- Create User Account
- Existing Users Management

This section enables administrator to add new users to the FIMS, as shown in Figure 5.11.

The screenshot shows a web browser window titled "RegisterUser - Microsoft Internet Explorer". The address bar displays "http://localhost/Admin/Forms/RegisterUser.aspx". The page content is for the "FORENSIC INFORMATION MANAGEMENT SYSTEM (FIMS)". In the top right corner, it shows "User: Guest" and "Date: 7/11/2006", with links for "Home" and "Log Out". The left sidebar features the "WEST VIRGINIA STATE POLICE" logo and the text "FORENSIC LABORATORY LABORATORY ADMINISTRATION". Below this, a list of navigation links includes "LabCase Management", "Users Management", "Agency Management", "Log Management", "System Options", "System Statistics", and "Change Password". The main content area has a header with "Create User Account | Existing Users Mgmt" and a prominent blue button labeled "Create new User Account". Below this, there are two sections: "Account Information" and "Demographic Information". The "Account Information" section contains fields for "User ID:", "Password:", "Agency Name:" (with a dropdown menu showing "WV050015J - 24TH CIRCUIT COURT"), and "Unit Name:" (with a dropdown menu showing "Originating Agency"). The "Demographic Information" section contains fields for "Last Name", "First Name", "Middle Initial:", and "Title:" (with a dropdown menu showing "Captain"). At the bottom of the form is a blue button labeled "Create New User". The browser's status bar at the bottom shows "Done" and "Local intranet".

Figure 5.11: Add User Section

Existing users section lists all the existing users in FIMS system. Agency dropdown allows administrator to choose agency and view all the users. Administrator can edit information, activate, or block a user. Blocking a user disables his/her, login and other rights granted, as shown in Figure 5.12.

The screenshot displays the 'ExistingUserMgmt' page in a Microsoft Internet Explorer browser. The address bar shows the URL: `http://localhost/Admin/Forms/ExistingUserMgmt.aspx`. The page header includes the 'FORENSIC INFORMATION MANAGEMENT SYSTEM' logo and the user's current session information: 'User: Guest' and 'Date: 7/11/2006'. A 'Home | Log Out' link is also present.

The main content area is titled 'Create User Account | Existing Users Mgmt'. It features a section for 'Existing users' with a 'Choose Agency' dropdown menu set to 'WV050015J - 24TH CIRCUIT COURT'. Below this is a table listing the existing users.

User ID	Agency ID	Agency Name	Department	Date Created	Date Blocked	Status
guest	WV050015J	24TH CIRCUIT COURT	81	2/7/2006 7:16:40 PM	N/A	Blocked Edit Delete

The sidebar on the left contains the 'WEST VIRGINIA STATE POLICE' logo and the 'FORENSIC LABORATORY ADMINISTRATION' text. Below this, a list of navigation links is provided: 'LabCase Management', 'Users Management', 'Agency Management', 'Log Management', 'System Options', 'System Statistics', and 'Change Password'.

Figure 5.12: Existing User Management Section

Agency Management

Agency management section enables administrator to view, add, delete, or disable existing agency. Agency management section allows navigating to the following sections:

- Add Agency
- Existing Agency Information Management

This section enables administrator to add new agency to the FIMS, as shown in Figure 5.13.

The screenshot shows a web browser window titled "AgencyInfoMgmt - Microsoft Internet Explorer". The address bar shows "http://localhost/Admin/Forms/AgencyInfoMgmt.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the text "User:Guest Date:7/11/2006". Below the header, there is a navigation menu with "Home" and "Log Out". The main content area is divided into two columns. The left column contains the "WEST VIRGINIA STATE POLICE" logo and a list of links: "LabCase Management", "Users Management", "Agency Management", "Log Management", "System Options", "System Statistics", and "Change Password". The right column is titled "Add Agency | Agency Information Mgmt" and contains a form titled "Add New Agency ID". The form has input fields for "Agency ID", "Agency Name", "Street", "City", "County", "State", "Zip Code", "Phone #", and "Contact Person". A "Create New Agency" button is located at the bottom of the form. The status bar at the bottom of the browser window shows "Done" and "Local intranet".

Figure 5.13: Add Agency Section

Existing agency information section list all the existing agencies in FIMS system. Administrator can delete and update agency information as shown in Figure 5.14.

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Guest
Date: 7/11/2006
[Home](#) | [Log Out](#)

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY LABORATORY ADMINISTRATION

LabCase Management
Users Management
Agency Management
Log Management
System Options
System Statistics
Change Password

[Add Agency](#) | [Agency Information Mgmt](#)

[Edit, Update or Delete existing agency](#)

Agency ID	Agency Name	Street	City	County	State	Zip	Phone	Contact Person	
111111111	WEST HAMLIN POLICE DEPT.	PO BOX 221	WEST HAMLIN		WV			1	Edit Delete
888888888	DEPARTMENT OF HEALTH	815 QUARRIER ST SUITE 418	CHARLESTON	KANAWHA	WV	25301	304-558-2981	PHILLIP R. JONES	Edit Delete
900000000	WORKERS COMPENSATION	420 9TH STREET PLAZA	HUNTINGTON	CABELL	WV	25701			Edit Delete
FL0000001	JUPITER POLICE DEPARTMENT	210 MILITARY TRAIL	JUPITER		FL	33458-5796	407-746-6201	DET. SCOTT PASCARELLA	Edit Delete
FL0360300	SANIBEL POLICE DEPARTMENT	800 DUNLOP ROAD	SANIBEL	LEE	FL	33957	813-472-3111	OFC. G. AL DOBBS	Edit Delete
LAB	Forensic LAB	44 Roger Street	Uniontown	Monangalia	WV	26505	456-9878	Manoday	Edit Delete
MMD000001	SO. REGIONAL DRUG TASK	P. O. BOX 1206	BLUEFIELD	MERCER	WV	24701	304-323-		Edit Delete

Figure 5.14: Existing Agency Information Management Section

Log management

FIMS automatically tracks and records all errors occurred, as shown in Figure 5.15. Error handling procedures gracefully handles error and prevents application from crashing. It saves the entire stack trace information provided by the .Net framework in case of error. This helps in location the source of error and fixing it.

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Guest
Date: 7/11/2006
[Home](#) | [Log Out](#)

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FORENSIC LABORATORY
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Users Management
Agency Management
Log Management
System Options
System Statistics
Change Password

Bug/Error Log | User Login Log

Error List

Error ID	Error Code	Error Description	Department	Date Occurred	Status
104		System.Web.HttpException: DataBinder.Eval: 'System.Data.DataRowView' does not contain a property with the name AgencyName. at System.Web.UI.DataBinder.GetPropertyValue(Object container, String propName) at System.Web.UI.DataBinder.GetPropertyValue(Object container, String propName, String format) at System.Web.UI.WebControls.ListControl.OnDataBinding(EventArgs e) at System.Web.UI.Control.DataBind() at Admin.RegisterUser.LoadDropDownList() in D:\Project Files\Admin\RegisterUser.aspx.vb:line 112 at Admin.RegisterUser.Page_Load(Object sender, EventArgs e) in D:\Project Files\Admin\RegisterUser.aspx.vb:line 87			
113	0	System.Threading.ThreadAbortException: Thread was being aborted. at System.Threading.Thread.AbortInternal() at System.Threading.Thread.Abort(Object stateInfo) at System.Web.HttpResponse.End() at System.Web.HttpResponse.Redirect(String url, Boolean endResponse) at System.Web.HttpResponse.Redirect(String url) at CERUnit.CERCaseReceival.btnSubmit_Click(Object sender, EventArgs e) in D:\Project Files\CERUnit\CERCaseReceival.aspx.vb:line 166	Laboratory Administration	4/12/2006 12:00:00 AM	n

Local intranet

Figure 5.15: Error Management Section

All user login are tracked by FIMS tracking procedures as shown in Figure 5.16. User ID, agency ID, unit, machine IP address and time of login are recorder for each login.

FORENSIC INFORMATION MANAGEMENT SYSTEM

User:Guest
Date:7/11/2006

[Home](#) | [Log Out](#)

WEST VIRGINIA STATE POLICE

**FORENSIC LABORATORY
LABORATORY ADMINISTRATION**

LabCase Management
Users Management
Agency Management
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Change Password

Bug/Error Log | User Login Log

User Login Log

ID	User ID	Agency ID	Unit	IP Address	Log In Date
768	admin	LAB	10	65.172.66.2	Apr 3 2006 1:37PM
769	ori1	WV0020100	81	68.232.178.236	Apr 5 2006 6:37PM
770	ori1	WV0020100	81	68.232.178.236	Apr 9 2006 9:06PM
771	ori1	WV0020100	81	65.172.66.2	Apr 12 2006 11:17AM
772	admin	LAB	10	65.172.66.2	Apr 12 2006 11:21AM
773	ori1	WV0020100	81	157.182.196.78	Apr 12 2006 1:22PM
774	cer	LAB	11	157.182.196.78	Apr 12 2006 1:23PM
775	pss	LAB	12	157.182.196.78	Apr 12 2006 1:25PM
776	ori1	WV0020100	81	157.182.196.93	Apr 17 2006 5:16PM
777	ori1	WV0020100	81	65.172.66.2	Apr 18 2006 2:20PM
778	ori1	WV0020100	81	65.172.66.2	Apr 18 2006 2:23PM
779	ori1	WV0020100	81	65.172.66.2	Apr 18 2006 2:24PM
780	46332	WVWSP0000	10	68.232.178.236	Apr 23 2006 6:54PM
781	ori1	WV0020100	81	157.182.196.78	Apr 30 2006 10:53AM
782	bio1	LAB	13	68.232.40.50	May 29 2006 8:31PM

Figure 5.16: User Login Tracking Section

System Settings

System settings section enables administrator to configure control parameters of FIMS, as shown in Figure 5.17. It allows navigating to the following sections:

- Change Error/Login Management Settings
- Dropdown List Options Management

Figure 5.17: System Setting Section

This section enables administrator to reset Error and Login list, as shown in Figure 5.18.

Change Login Settings - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Go Links

Address http://localhost/Admin/Forms/LoginSettings.aspx

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Guest
Date: 7/11/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

**FORENSIC LABORATORY
LABORATORY ADMINISTRATION**

LabCase Management
Users Management
Agency Management
Log Management
System Options
System Statistics
Change Password

Currently Saving Login Log for Last 100 Days

Save Login Log of Last days.

[Save Settings](#)

Currently Saving Error Log for Last 100 Days

Save Error Log of Last days.

[Save Settings](#)

Done Local intranet

Figure 5.18: Error/Login parameters setting Section

This section allows view and configures dropdown list values, as shown in Figure 5.19.

Figure 5.19: Dropdown List Options Section

System Statistics

This section enables viewing all the cases by years as shown in figure 5.20. On completion this section enables administrator to generate case statistics.

System Statistics - Microsoft Internet Explorer

Address: <http://localhost/Admin/Forms/SysStat.aspx>

FORENSIC INFORMATION MANAGEMENT SYSTEM

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY
LABORATORY ADMINISTRATION

LabCase Management
Users Management
Agency Management
Log Management
System Options
System Statistics
Change Password

View All Cases: 1991

Labcase number	UserID	AgencyID	Dept	Agency caseID	Criminal offense	crime date	crime time	PlaceOfCrime
1991000001	111111111	WVWSP6000			1899	1991-02-16	00:00:00	
1991000002	111111111	WV0200000			1447	1991-04-13	00:00:00	
1991000003	111111111	WVWSP3100		F6408	2093	1991-04-16	00:00:00	
1991000004	111111111	WVWSP6000		DN-9167-8168	1561	1991-04-16	00:00:00	
1991000005	111111111	WV0410000		915272	118	1991-04-17	00:00:00	
1991000006	111111111	WV0170200		91-109137	1902	1991-04-23	00:00:00	
1991000007	111111111	WV0000000		011101	1055	1991-04-25	00:00:00	

Done Local intranet

Figure 5.20: System Statistics Section

Change Password Section

Administrator can change password through this section by providing appropriate user credentials as shown in Figure 5.21.

The screenshot shows a web browser window titled "Change Password - Microsoft Internet Explorer". The address bar displays "http://localhost/Admin/Forms/changepass.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the text "User: Guest Date: 7/11/2006". Below the header, there is a "Home | Log Out" link. The main content area is divided into two columns. The left column contains the "WEST VIRGINIA STATE POLICE" logo and the text "FORENSIC LABORATORY LABORATORY ADMINISTRATION". Below this, a list of links is provided: "LabCase Management", "Users Management", "Agency Management", "Log Management", "System Options", "System Statistics", and "Change Password". The right column contains the "Change Password" form, which includes fields for "Username: admin", "Old Password:", "New Password:", and "Re-enter new Password:". A "Submit" button is located below the "Re-enter new Password" field. The browser's status bar at the bottom indicates "Local intranet".

Figure 5.21: Change Password Section

Exiting Laboratory Administration

Administrator can terminate the current session by clicking on “*Log Out*” hyperlink on the top right corner of the page.

CHAPTER 6

BIOCHEMISTRY

6.1 Existing Biochemistry Process

The Biochemistry Unit of the laboratory receives and examines physical evidence for the presence of biological material. This unit performs DNA analysis on blood, semen, and other biological specimens. The sensitivity of DNA analysis allows a large variety of samples to be tested. Generally, any cellular material can be used as a source of DNA. In routine casework the techniques are so sensitive that DNA profiles have been obtained from blood stained clothing that had been washed, from gum that had been chewed, and from envelopes that have been licked. The Biochemistry unit manages the Convicted Offender DNA Identification System (CODIS) program for the State of West Virginia. All individuals convicted of violent crimes, sex offenses and most felonies in the State of West Virginia are required to provide the State Police with a DNA sample for analysis. After analysis, the DNA profile of the convicted offender is entered into a national database managed by the FBI. DNA profiles developed from evidence are compared to the convicted offender database. If a hit or match occurs as a result of a database search, laboratory personnel review the match to determine what additional action is required. If appropriate, the investigating agency is contacted with the name of the convicted offender whose profile matched the evidence [16].

The analyst in the biochemistry unit receives the LEIF form and chain of custody form along with the evidence items. The analyst prepares samples and performs the required test. The test results are documented on appropriate forms. The forms used in the Biochemistry unit are: Extraction & Amplification (EA) worksheet, Product Gel (PG) worksheet, Yield Gel (YG) worksheet, and Sperm Identification (SI) worksheet. Once the examinations are completed, the evidence is returned to the CER and the secretary prepares a draft report. The draft report is then reviewed by the analyst/reviewer. After approval, the final report is sent to CER. Figure 6.1 shows the existing process for the biochemistry unit.

Figure 6.1: Existing Process for Biochemistry Unit

6.2 Re-engineering the Biochemistry Process

The analyst in the biochemistry unit receives the items assigned for further processing and analysis from CEP. Received items are sub-divided into samples for conducting the requested tests. An individual item may be divided into many samples according to the requirement and complexity of the required test. A report for each sample is generated. An item report is compiled by combining sample reports. After the report is received, the reports along with the test items are sent back to CEP for further processing. Evidence and information flow diagram is shown in Figure 6.2.

Figure 6.2: Evidence & Information Flow

Detail procedure followed by biochemistry unit for further processing and analysis is shown in Figure 6.3.

Figure 6.3: Evidence Item Processing & Report Generation

6.2.1 Biochemistry Entity Relationship Diagram

Biochemistry data tables are connected with each other through relations as shown in the figure 6.4

Figure 6.4: Entity Relationship Diagram

6.2.2 Biochemistry Database Tables

The biochemistry unit module stores its data in the following tables

- Product Gel (tbl_Bio_Product_GelInfo & tbl_Bio_Product_Worksheet)
- Sperm Identification (tbl_Bio_SpermIdent)
- Yield Gel (tbl_Bio_Yield_GelInfo)
- Extraction and Amplification (tbl_Bio_Exctraton_Worksheet & ExctratonAndAmplification)

The various fields of the Product gel table are shown in Table 6-1. Product gel worksheet data is stored in Product gel Information (tbl_Bio_Product_GelInfo) and Product gel worksheet (tbl_Bio_Product_Worksheet) tables.

Table 6-1: Product Gel Table

tbl_Bio_Product_WorkSheet
LabcaseID
ItemID
SampleID
Analyst
Witness
GelContrlLotNumber
Amplification
GelDate
GelVolt
GelTime
Buffer
Agarose_Nuisieve
Agarose_GTG
SampleVolume
Comments
TestResult
DateCreated

Table 6-2: Product Gel Worksheet Table

tbl_Bio_Product_GelInfo
LabCaseID
ItemID
SampleID
SerialID
Sample
Dilution
Mix
GelLoad

The various fields of the sperm identification table are shown in Table 6-3. Sperm identification worksheet data is stored and maintained in this data table

Table 6-3: Sperm Identification Table

tbl_Bio_SpermIdent
LabCaseID
ItemID
SampleID
Analyst
Witness
GelVolt
Spermatozoa
Magnification
Comments
TestResult
DateCreated

The various fields of the yield gel worksheet table are shown in Table 6-4. Yield gel worksheet data is stored and maintained in this data table

Table 6-4; ; Yield Gel Table

tbl_Bio_Yield_GelInfo
LabCaseID
ItemID
SampleID
SerialID
	Sample
	EGC_ng
	EGC_ng_ul
	EGC_Dil
	EQC_ng
	EQC_ng_ul
	EQC_Dil
	FinalDil
	AA_PowerPlex
	AA_Other1
	AA_Other2

Table 6-5: Yield Gel Worksheet Table

tbl_Bio_Yield_Worksheet
LabCaseID
ItemID
SampleID
	Analyst
	Witness
	GelContrlLotNumber
	Amplification
	GelDate
	GelVolt
	Time25Min
	Gel
	Buffer
	controlVolume
	SampleVolume
	Comments
	TestResult
	DateCreated

The various fields of the extraction and amplification table are shown in Table 6-6. Extraction and amplification worksheet data is stored in Extraction & amplification and Product gel worksheet (tbl_Bio_Extraction_Worksheet) tables.

Table 6-6: Extraction & Amplification Table

tbl_Bio_ExtractionAndAmplification
LabcaseID
ItemID
SampleID
Analyst
Witness
ExtractionMethod
Questioned
QuestDate
QuestHood
QuestOrganicDate
QuestArea
Known
KnownDate
KnownHood
KnownOrganicDate
KnownArea
Comments
TestResult
DateCreated

Table 6-7: Extraction & Amplification Worksheet Table

tbl_Bio_Extraction_Worksheet
LabCaseID
ItemID
SampleID
SerialID
Description
Lysis
Centricon
Amp
Ampno

6.2.3 Working with Biochemistry

Biochemistry home page requires username and password to verify user credentials, as shown in the Figure 6.5. After verifying credentials, a user is directed to list of items assigned to him/her for further processing.

Figure 6.5: Biochemistry Home Page

View Items Assigned

Figure 6.6 shows the list of items assigned to the analyst by the laboratory administration unit for further analysis. Initially job status for the item assigned is set to “Job Pending”. The “View Details” hyperlink enables an analyst to view the details of the case. If the list of items assigned grows long i.e. more than 15 items, the record set is divided into multiple pages. Analysts can navigate between different pages by clicking on the header and footer navigation bar of the list.

The screenshot displays the 'Assigned Items List' within the FIMS application. The interface is viewed through Microsoft Internet Explorer. The top navigation bar includes the FIMS logo, the user's name (Josh M. Gomery), and the date (7/12/2006). The sidebar on the left identifies the user as belonging to the West Virginia State Police Forensic Laboratory Biochemistry unit and provides links for 'Open Existing Case' and 'Change Password'. The main content area features a table titled 'List of Item(s) Assigned' with five rows of data. Each row includes a LabCase #, Item ID, Date Assigned, Test Status, and a link to 'Item Detail'. The status for all items is 'Job Pending'. The footer of the application indicates it is copyrighted by Rashpal S. Ahluwalia at West Virginia University in 2006.

LabCase #	Item ID	Date Assigned	Test Status	
2006000004	2006000004-P-1-1-4	6/9/2006	Job Pending	Item Detail
2006000004	2006000004-P-2-1-3	6/9/2006	Job Pending	Item Detail
2006000005	2006000005-P-1-1-1	7/5/2006	Job Pending	Item Detail
2006000006	2006000006-P-2-1-1	7/6/2006	Job Pending	Item Detail
2006000007	2006000007-P-1-1-1	7/11/2006	Job Pending	Item Detail

Figure 6.6: Assigned Item List

Item Picture Management

This section describes the procedure of attaching pictures to an item. Analysts can perform two kinds of operation:

- View Pictures
- Upload Pictures

Analysts can access this section by clicking on the “*View/Upload Item Photo*” hyperlink in the item details section as shown in Figure 6.9. View picture section list the pictures already attached to the item with their thumbnails as shown in Figure 6.7. Analysts can also view the full size image by clicking on the image thumbnail. Full size image opens in a new window, which can be closed after use.

Figure 6.7: View Item Photo

Analysts can upload any digital photo in JPG format directly into the database using this section as shown in Figure 6.8. To upload an image into database, analysts are required to browse for the image path, set other required fields and click on the “*Upload the file*” hyperlink. On successful upload a thumbnail appears on the bottom of the page with a success message.

Photo - Microsoft Internet Explorer

Address <http://localhost/BIO/Forms/Photo.aspx>

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Gomery, Josh M
Date: 7/12/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

**FORENSIC LABORATORY
BIOCHEMISTRY**

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

[View Pictures](#) [Upload Pictures](#)

Photo Notes Sheet

LabCase#: 2006000007
ItemID: 2006000007-P-1-I-1
Select File : [Browse...](#)
File Name :
Notes:
[Upload the files >](#)

Image file uploaded

©2006 Rashpal S. Ahluwalia: West Virginia University

Local intranet

Figure 6.8: Upload Item Picture Section

Working with Samples

Analysts receive items from the CEP unit for further analysis and processing. Once received items are sub-divided into samples for conducting requested tests. Each item is divided into one or more samples according to the requirement and complexity of the required test.

Analysts can create new, update or delete existing samples from the item details section as shown in Figure 6.9. To add a new sample analyst is required to provide description of sample and then click on “*Add Sample*” hyperlink. FIMS application automatically adds the time stamp to the item created. Initially, sample test status is set to “*Test Pending*” for the sample. Sample information can be updated by clicking on “*Edit*” hyperlink and existing sample can be deleted from the system by clicking on “*Delete*” hyperlink.

This section also enables analysts to view the final sample, sample photo, item, and item photo report. To access the individual sample/sample photo report analyst can click on “*View Report*” or “*Photo Sheet*” hyperlink. To view comprehensive item report analysts can click on “*Item Report*” or “*Item Photo Report*” hyperlink at the bottom of the page.

To complete the process for item testing, the analyst is required to click on “*Item Test Complete*” button, as shown in Figure 6.9. Once clicked, analyst will not be able to make any alterations to the existing item test report.

ItemDetail - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address http://localhost/BIO/Forms/ItemDetail.aspx Go Links >>

WEST VIRGINIA STATE POLICE

**FORENSIC LABORATORY
BIOCHEMISTRY**

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Create/View Sample(s) for Item

LabCase#: 2006000007
Item ID : 2006000007-P-1-1-1
Item Name: Pairs of Boots
Item Description: Pairs of Boots (Suspect's)
Exam Requested: Blood Identification

Upload Item Photo

View/Upload Item Photos

List of Samples (Test Pending / In process)

Edit	Sample ID	Sample Description	Date Created	Test Status
Delete Edit	2006000007-P-1-1-1-S-2	Sample 2	7/12/2006 7:04:52 PM	Test Pending Choose Add Test Photo
Delete Edit	2006000007-P-1-1-1-S-3	Sample 3	7/12/2006 7:04:59 PM	Test Pending Choose Add Test Photo

Add Sample

List of Sample Report(s) (Test Done)

Sample ID	Sample Description	Date Created	Test Status
2006000007-P-1-1-1-S-1	Sample 1	7/12/2006 7:04:44 PM	Test Done View Report Photo Sheet

Local intranet

Figure 6.9: Item Detail Section

Analysts can access this section by clicking on the “*View/Upload Sample Photo*” hyperlink in the item details section as shown in Figure 6.9. View picture section list the pictures already attached to the item with their thumbnails as shown in Figure 6.10. Analysts can also view the full size image by clicking on the image thumbnail. Full size image opens in a new window, which can be closed after use.

Figure 6.10: View Picture Section

Analysts can upload any digital photo in JPG format directly into the database using this section as shown in Figure 6.11. To upload an image analysts are required to browse for the image path, set other required fields and click on the “*Upload the file*” hyperlink to upload the image into database. On successful upload a thumbnail appears on the bottom of the page with a success message.

Figure 6.11: Upload Sample Picture Section

Choosing Test Worksheet

After sample creation, analysts are required to decide what kinds of tests are required? Analysts choose type of test manually. Once the decision is made the analyst can see the list of tests available, and then click “*Choose Test*” hyperlink as shown in Figure 6.12. FIMS remembers the chosen sample ID during the process.

The worksheets for the biochemistry are:

- Extraction/Amplification
- Sperm Identification
- Product gel
- Yield gel

Figure 6.12: Choose Sample Test Section

Extract/Amplification Worksheet

Extraction/Amplification worksheet is used for filling information pertaining to extraction/amplification test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 6.13. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "Extraction & Amplification - Microsoft Internet Explorer". The address bar shows the URL: `http://localhost/BIO/Forms/Extract.aspx?SID=2006000007-P-1-I-1-S-1`. The page content is divided into a left sidebar and a main form area.

Left Sidebar:

- WEST VIRGINIA STATE POLICE (with logo)
- FORENSIC LABORATORY BIOCHEMISTRY
- Open Existing Case
- Item Details
- Chain Of Custody
- Send Items
- Receive Items
- Change Password

Main Form Area:

- Save Results** button
- Extraction & Amplification Worksheet** header
- LabCase#: 2006000007 Analyst:
- SampleID: 2006000007-P-1-I-1-S-1 Witness:
- EXTRACTION METHOD:
- Questioned : Date/Time: 7/12/2006
- HOOD: Organic Date: 7/12/2006
- Area:
- Known: Date/Time: 7/12/2006
- HOOD: Organic Date: 7/12/2006
- Area:
- Buttons: Delete, Edit, ID, Description, Lysis, Centricon, AMP, AMP NO
- General Comments:
- Test Result(s):

The browser's status bar at the bottom shows "Done" and "Local intranet".

Figure 6.13: Extraction /Amplification worksheet

Sperm Identification Worksheet

Sperm identification worksheet is used for filling information pertaining to sperm identification test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 6.14. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "Sperm - Microsoft Internet Explorer". The address bar displays "http://localhost/BIO/Forms/Sperm.aspx?SID=2006000007-P-1-I-1-S-1". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Gomery, Josh M" and "Date: 7/12/2006". A "Home | Log Out" link is also present. The main content area is titled "Sperm Identification Worksheet" and contains a "Save Results" button. Below this, there are input fields for "Labcasenumber: 2006000007", "Analyst:", "SampleID: 2006000007-P-1-I-1-S-1", and "Witness:". There are also dropdown menus for "Gel Volts: 100v" (set to "No"), "Spermatozoa" (set to "None"), and "Magnification" (set to "100X"). A "General Comments:" section with a text area is below these. A "Test Result:" section with a larger text area is at the bottom. A red note at the bottom of the form states: "* Note: Use this option only when test is done". On the left side of the page, there is a sidebar for "WEST VIRGINIA STATE POLICE" and "FORENSIC LABORATORY BIOCHEMISTRY" with a list of links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password". The browser's status bar at the bottom shows "Done" and "Local intranet".

Figure 6.14: Sperm Identification Worksheet

Product Gel Worksheet

Product gel worksheet is used for filling information pertaining to product get test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 6.15. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "Product - Microsoft Internet Explorer". The address bar displays the URL: `http://localhost/BIO/Forms/Product.aspx?SID=2006000007-P-1-I-1-S-1`. The page content is divided into a left sidebar and a main form area.

Left Sidebar:

- WEST VIRGINIA STATE POLICE (with logo)
- FORENSIC LABORATORY BIOCHEMISTRY
- Open Existing Case
- Item Details
- Chain Of Custody
- Send Items
- Receive Items
- Change Password

Main Form Area:

- A "Save Results" button is at the top.
- A blue header bar reads "Product Gel Worksheet".
- Form fields include:
 - LabCase#: 2006000007
 - Analyst: [text box]
 - SampleID: 2006000007-P-1-I-1-S-1
 - Witness: [text box]
 - Gel Control Lot Number: [text box]
 - Amplification: [text box]
 - Gel Date: 7/12/2006 (with a calendar icon)
 - Gel Volts: 100v: ☐
 - Time: 30 Min: ☐
 - Buffer 1X TAE: ☐
 - Agarose: ☐
 - GTG: 1%: ☐
 - Nuisieve: 3%: ☐
 - Sample Volume: 5 ul: ☐
- A table header bar contains: Delete, Edit, LANE, SAMPLE, Gel Dilution (ul), Mix (ul), Gel Load.
- A "General Comments" section with a text area.
- A blue header bar reads "Test Result" with a text area below it.

The browser's status bar at the bottom shows "Done" and "Local intranet".

Figure 6.15: Product Gel Worksheet

Yield Gel Worksheet

Yield gel worksheet is used for filling information pertaining to yield gel test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 6.16. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

WEST VIRGINIA STATE POLICE
FORENSIC LABORATORY
BIOCHEMISTRY

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Save Results

Yield Gel / Amplification Worksheet

Labcasenumber: 2006000007 Analyst: _____
SampleID: 2006000007-P-1-1-1-S-1 Witness: _____
Gel Control Lot Number: _____
Amplification : _____ Gel Date: 7/12/2006
Gel Volts:100v: ☐ Time:25 Min ☐
Buffer 1X TAE: ☐
Gel: SEAKEM(ME): ☐
Sample Volume: 5 ul Control Volume: ☐

Delete	Edit	LANE	SAMPLE	EGC (ng)	EGC (ng/ul)	EGC (Dil)	EQC (ng)	EQC (ng/ul)	EQC (Dil)	Final Dilution (ng/ul)	AM- Power Plex16 (ul)	Other 1(ul)	Other 2(ul)
--------	------	------	--------	-------------	----------------	--------------	-------------	----------------	--------------	------------------------------	--------------------------------	----------------	----------------

General Comments:

Test Result(s):

Figure 6.16: Yield Gel Worksheet

Receive Item

Once an item is sent by CEP unit, Biochemistry unit analyst is responsible for receiving it by clicking on “*Receive*” button, under receive item section, as shown in Figure 6.17. This completes the handshaking protocol of item transfer between units.

Figure 6.17: Receive Item Section

Send Item

After completion of item testing, analyst is required to return the evidence item back to CEP unit. Figure 6.18 shows the section used to send an item back to the CEP unit. Analyst can use the drop down to select item ID and click on “*Send*” hyperlink, to send item back to CEP.

The screenshot shows a web browser window titled "SendItems - Microsoft Internet Explorer" with the address bar displaying "http://localhost/BIO/Forms/SendItems.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Gomery, Josh M" and "Date: 7/12/2006". A navigation menu on the left lists "WEST VIRGINIA STATE POLICE" and "FORENSIC LABORATORY BIOCHEMISTRY", along with links for "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password". The main content area is titled "Send Item(s)" and displays "Item Selected: 2006000007-P-1-I-1". Below this is a table with columns "Delete", "Item ID", "Sent By", "To Unit", and "Sent Request Date". The table contains one row with the item ID "2006000007-P-1-I-1", "bio1", "12", and "7/12/2006 7:04:04 PM". A "Send" button is located below the table, and a dropdown menu is visible next to the item ID.

Delete	Item ID	Sent By	To Unit	Sent Request Date
Delete	2006000007-P-1-I-1	bio1	12	7/12/2006 7:04:04 PM

Send 2006000007-P-1-I-1

Figure 6.18: Send Item Section

Chain of Custody

Item chain of custody information is shown in Figure 6.19. FIMS application records used ID, unit name, and time stamp for tracking item chain of custody.

Chain Of Custody

Item Selected: 2006000007-P-1-1-1

Item ID	Sent Unit	Sent By	Date Sent	To Unit	Received By	Date Received	Status
2006000007-P-1-1-1	Central Evidence Processing	pss	7/11/2006 9:06:49 PM	Biochemistry	bio1	7/12/2006 7:03:28 PM	Received

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Figure 6.19: Item Chain Of Custody

Change User Password

Analyst can change password through this section by providing appropriate credentials as shown in Figure 6.20.

The screenshot shows a web browser window titled "Change Password - Microsoft Internet Explorer". The address bar displays "http://localhost/BIO/Forms/Changepass.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Gomery, Josh M" and "Date: 7/12/2006". There are links for "Home" and "Log Out". The main content area is divided into two sections. The left section, titled "WEST VIRGINIA STATE POLICE", features the state police logo and the text "FORENSIC LABORATORY BIOCHEMISTRY". Below this, there are links for "Open Existing Case" and "Change Password". The right section, titled "Change Password", contains a form with the following fields: "Username:" (pre-filled with "bio1"), "Old Password:", "New Password:", and "Re-enter new Password:". A "Submit" button is located below the form. The footer of the page indicates "©2006 Rashpal S. Ahluwalia, West Virginia University".

Figure 6.20: Change Password Section

Exiting Biochemistry

Users can terminate the current session by clicking on “*Log Out*” hyperlink on the top right corner of the page.

6.2.4 Generating Item and Sample Reports

The analyst can generate the following types of reports

- Item Report
- Item Photo Report
- Sample Report
- Sample Photo Report

Figure 6.21 shows the item report, which is a cumulative report for all the samples. This section also facilitate analyst to export report via PDF/MS-Word format.

Figure 6.21: Item report

Figure 6.22 shows the sample report for extraction and amplification test. This report can also be accessed via PDF format, as shown in Figure 6.23.

The screenshot shows a Microsoft Internet Explorer window with the address bar displaying `http://localhost/BIO/Forms/Report_ItemReport.aspx`. The browser's menu bar includes File, Edit, View, Insert, Format, Tools, Table, Go To, Favorites, and Help. The address bar also shows a search bar and a Go button. The main content area displays a report titled "Forensic Laboratory Biochemistry Unit Item Report". The report includes the following information:

Forensic Laboratory Biochemistry Unit	
Item Report	
Labcase Number:	2006000007
Package ID:	2006000007-P-1
Item ID:	2006000007-P-1-I-1
Item Description:	Pairs of Boots (Suspect's)
Sample ID:	2006000007-P-1-I-1-S-1
Sample Description:	Sample 1
Test Result:	Match
Sample ID:	2006000007-P-1-I-1-S-2
Sample Description:	Sample 2

Figure 6.22: Sample Report in MS Word Format

Figure 6.23: Sample Report in PDF Format

Figure 6.24: Item Photo Report

Figure 6.25: Sample Photo Report

CHAPTER 7

DRUG IDENTIFICATION

7.1 Existing Drug Identification Process

The purpose of the Drug Identification Unit is to analyze and identify any suspected controlled substances. Identification of controlled substances is necessary to prove violations of the Controlled Substances Act. Analysts in the drug identification unit receive the CR form, the LEIF form, and the evidence to be analyzed. A chain of custody form is also attached to the evidences. Drug evidence includes powders, liquids, tablets, capsules, and plant material samples suspected of being or containing controlled substances. The drug identification unit does not analyze blood, urine, or other pathological specimens for the presence of controlled substances. The forms/worksheets used by the Drug Identification unit are: Clandestine Test (CT), Marihuana Test (MT), Tablet & Capsule Test (TC), Unknown Liquid Test (UL), Unknown Powder Test (UP), and Vegetation Test (VT). Once the examinations are completed, the evidence is returned to the CER and the secretary prepares a draft report. The draft report is then reviewed by the analyst/reviewer. After approval the final report is sent to CER. Figure 7.1 shows the existing process for the drug identification unit.

Figure 7.1: Existing Process for the Drug Identification Unit

7.2 Re-engineering the Drug Identification Process

The analyst in the drug identification unit receives the items assigned for further processing and analysis from CEP. Received items are sub-divided into samples for conducting the requested tests. An individual item may be divided into many samples according to the requirement and complexity of the required test. A report for each sample is generated. An item report is compiled by combining sample reports. After the report is received, the reports along with the test items are sent back to CEP for further processing. The evidence and information flow diagram is shown in Figure 7.2.

Figure 7.2: Step 5 Receive Assigned Items from CEP

Detail procedure followed by drug identification unit for further processing and analysis is shown in Figure 7.3.

Figure 7.3: Detail Evidence Item Processing & Report Generation Procedure

7.2.1 Drug Identification Entity Relationship Diagram

Drug identification data tables are connected with each other through relations as shown in the figure 7.4.

Figure 7.4: Entity Relationship Diagram

7.2.2 Drug Identification Data Tables

The drug identification unit module stores its data in the following tables

- Clandestine(tbl_Drug_Clandestine_Worksheet)
- Marihuana (tbl_Drug_Marihuana_Worksheet)
- Unknown Powder (tbl_Drug_UnknownPowder_Worksheet)
- Tablet and Capsule (tbl_Drug_TabletAndCapsula_Worksheet)
- Unknown Liquid (tbl_Drug_UnknownLiquid_Worksheet)
- Vegetation(tbl_Drug_Vegetation_Worksheet)

The various fields of the clandestine worksheet table are shown in Table 7-1.

Clandestine worksheet data is stored and maintained in this data table

Table 7-1: Clandestine Worksheet Table

tbl_Drug_Clandestine_Worksheet	
LabCaseID	
ItemID	
SampleID	
Analyst	
Witness	
IRValidation	
KBrBlank	
VaporCellBlank	
MarquisReagent	
Blankused	
Blank	
FormSample	
phValue	
Amountused	
Marquis	
OtherM	
IRExtraction	
IRResult	
ApproxAmount	
FlameTest	

The various fields of the comparison worksheet table are shown in Table 7-2.
Comparison worksheet data is stored and maintained in this data table

Table 7-2: Comparison Worksheet Table

tbl_FireArms_ComparisonSheet
LabCaseID
ItemID
SampleID
Analyst
Witness
Comparison1
Comparison2
ClassChar
IndvChar
Conclusion
DateCreated
Comments
Results

The various fields of the distance determination worksheet table are shown in Table 7-3. Distance determination worksheet data is stored and maintained in this data table

Table 7-3: Distance Determination Worksheet Table

tbl_FireArms_DistDetermination
LabCaseID
ItemID
SampleID
IDLocation
Analyst
Witness
GunManufacturer
SerialNumber
GunModel
GunBrLLength
GunCaliber
GunHdStampManuf
GunProjcType
GunProjcWt
GunPowderType
CartDesignation
IBISEntry
EntryDate
ResonNoEntry
IBISCorrelation
DateCreated
Comments
Results

The various fields of the unknown liquid worksheet table are shown in Table 7-4.
Unknown liquid worksheet data is stored and maintained in this data table

Table 7-4: Unknown Liquid Worksheet Table

tbl_Drug_UnknownLiquid_WorkSheet	
LabCaseID	
ItemID	
SampleID	
Analyst	
Witness	
IRValidation	
KBrBlank	
ReagentControl	
MarquisReagent	
Blankused	
Blank	
FormSample	
phValue	
Amountused	
Marquis	
OtherM	
IRExtraction	
IRResult	
ApproxAmount	
Flametest	
OtherF	
GCMSExtraction	
GCMSResult	
datecompleted	
Comments	
TestResult	

The various fields of marihuana worksheet table are shown in Table 7-5. Marihuana worksheet data is stored and maintained in this data table

Table 7-5: Marihuana Worksheet Table

tbl_Drug_Marihuana_worksheet	
	LabCaseID
	ItemID
	SampleID
	Analyst
	Witness
	ReagentControl
	PositiveControl
	NegativeControl
	Weight
	Macroscopic
	ModDL
	ApproxAmount
	Microscopic
	Identification
	datecompleted
	Comments
	TestResult

The various fields of the unknown powder worksheet table are shown in Table 7-6. Unknown powder worksheet data is stored and maintained in this data table

Table 7-6: Unknown Powder Worksheet Table

tbl_Drug_UnknownPowder_WorkSheet	
	LabCaseID
	ItemID
	SampleID
	Analyst
	Witness
	IRValidation
	KBrBlank
	ReagentControl
	MarquisReagent
	Blankused
	Blank
	FormSample
	Weight
	Marquis
	OtherM
	IRExtraction
	IRResult
	ApproxAmount
	Flamettest
	OtherF
	GCMSExtraction
	GCMSResult
	datecompleted
	Comments
	TestResult

- The various fields of the tablet and capsule worksheet table are shown in Table 7-
7. Tablet and capsule worksheet data is stored and maintained in this data table

Table 7-7: Tablet & Capsule Table

tbl_Drug_TabletAndCapsule_Worksheet	
	LabCaseID
	ItemID
	SampleID
	Analyst
	Witness
	IRValidation
	KBrBlank
	ReagentControl
	MarquisReagent
	Blankused
	Blank
	FormSample
	Weight
	Logo
	OtherM
	IRExtraction
	IRResult
	ApproxAmount
	Marquistest
	OtherF
	GCMSExtraction
	GCMSResult
	datecompleted
	Comments
	TestResult

The various fields of the vegetation worksheet table are shown in Table 7-8.
Vegetation worksheet data is stored and maintained in this data table

Table 7-8: Vegetation Worksheet Table

tbl_Drug_Vegetation_Worksheet	
	LabCaseID
	ItemID
	SampleID
	Analyst
	Witness
	DLReagentControl
	KBrBlank
	ReagentControl
	MarquisReagent
	Blankused
	Blank
	Weight
	Macroscopic
	ModDL
	ApproxAmount
	Microscopic
	TLC
	Other
	datecompleted
	Comments
	TestResult

7.2.3 Working with Drug Identification

Drug Identification home page requires username and password to verify user credentials, as shown in the Figure 7.5. After verifying credentials, a user is directed to list of items assigned to him/her for further processing.

Figure 7.5: Drug Identification Home Page

View Items Assigned

Figure 7.6 shows the list of items assigned to the analyst by the laboratory administration unit for further analysis. Initially, job status for the item assigned is set to “Job Pending”. The “View Details” hyperlink enables an analyst to view the details of the case. If the list of items assigned grows to more than 15 items, the record set is divided into multiple pages. Analysts can navigate between different pages by clicking on the header and footer navigation bar of the list.

AssignedItemsList - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://localhost/Drugunit/Forms/AssignedItemsList.aspx> Go Links >>

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Douglas, Mat J
Date: 7/12/2006
Home | Log Out

WEST VIRGINIA STATE POLICE

**FORENSIC LABORATORY
DRUG IDENTIFICATION**

Open Existing Case
Change Password

List of Item(s) Assigned

LabCase #	Item ID	Date Assigned	Test Status	
2006000004	2006000004-P-1-1-3	6/9/2006	Job Pending	Item Detail
2006000005	2006000005-P-1-1-2	7/5/2006	Job Pending	Item Detail
2006000006	2006000006-P-2-1-2	7/6/2006	Job Pending	Item Detail
2006000006	2006000006-P-2-1-3	7/6/2006	Job Pending	Item Detail
2006000007	2006000007-P-1-1-4	7/11/2006	Job Pending	Item Detail

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Local intranet

Figure 7.6: Assigned Item List

Item Picture Management

This section describes the procedure of attaching pictures to an item. Analysts can perform two kinds of operation:

- View Pictures
- Upload Pictures

Analysts can access this section by clicking on the “*View/Upload Item Photo*” hyperlink in the item details section as shown in Figure 7.9. View picture section list the pictures already attached to the item with their thumbnails as shown in Figure 7.7. Analysts can also view the full size image by clicking on the image thumbnail. Full size image opens in a new window, which can be closed after use.

Figure 7.7: View Item Photo

Analysts can upload any digital photo in JPG format directly into the database using this section as shown in Figure 7.8. To upload an image into database, analysts are required to browse for the image path, set other required fields and click on the “*Upload the file*” hyperlink. On successful upload a thumbnail appears on the bottom of the page with a success message.

Figure 7.8: Upload Item Picture Section

Working with Samples

Analysts receive items from the CEP unit for further analysis and processing. Once received items are sub-divided into samples for conducting requested tests. Each item is divided into one or more samples according to the requirement and complexity of the required test.

Analysts can create new, update or delete existing samples from the item details section as shown in Figure 7.9. To add a new sample, analyst is required to provide description of sample and then click on “*Add Sample*” hyperlink. FIMS application automatically adds the time stamp to the item created. Initially, sample test status is set to “*Test Pending*” for the sample. Sample information can be updated by clicking on “*Edit*” hyperlink and existing sample can be deleted from the system by clicking on “*Delete*” hyperlink.

This section also enables analysts to view the final sample, sample photo, item, and item photo report. To access the individual sample/sample photo report analyst can click on “*View Report*” or “*Photo Sheet*” hyperlink. To view comprehensive item report analysts can click on “*Item Report*” or “*Item Photo Report*” at the bottom of the page.

To complete the process for item testing, the analyst is required to click on “Item Test Complete” button, as shown in Figure 7.9. Once clicked, analyst will not be able to make any alterations to the existing item test report.

ItemDetail - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address http://localhost/Drugunit/Forms/ItemDetail.aspx Go Links >>

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY
DRUG IDENTIFICATION

Open Existing Case
 Item Details
 Chain Of Custody
 Send Items
 Receive Items
 Change Password

Create/View Sample for Item

LabCase#: 2006000007
 Item ID : 2006000007-P-1-I-4
 Item Name: Scissors
 Item Description: Scissors (Front Porch)
 Exam Requested: Drug Identification

Upload Item Photo

View/Upload Item Photos

List of Samples (Test Pending / In process)

Edit	Sample ID	Sample Description	Date Created	Test Status
Delete Edit	2006000007-P-1-I-4-S-1	Sample 1	7/12/2006 7:29:24 PM	Test Inprocess Choose Test Add Photo
Delete Edit	2006000007-P-1-I-4-S-3	Saple 3	7/12/2006 7:29:41 PM	Test Pending Choose Test Add Photo

[Add Sample](#)

List of Samples (Test Done)

Sample ID	Sample Description	Date Created	Test Status
2006000007-P-1-I-4-S-2	Sample 2	7/12/2006 7:29:30 PM	Test Done View Result Photo Sheet

List of Item Report(s)

View Item Report

Figure 7.9: Item Detail Section

Analysts can access this section by clicking on the “*View/Upload Sample Photo*” hyperlink in the item details section as shown in Figure 7.9. View picture section list the pictures already attached to the item with their thumbnails as shown in Figure 7.10. Analysts can also view the full size image by clicking on the image thumbnail. Full size image opens in a new window, which can be closed after use.

Figure 7.10: View Picture Section

Analysts can upload any digital photo of JPG format directly into the database using this section as shown in Figure 7.11. To upload an image into database analysts are required to browse for the image path, set other required fields and click on the “*Upload the file*” hyperlink. On successful upload a thumbnail appears on the bottom of the page with a success message.

Figure 7.11: Upload Sample Picture Section

Choosing Test Worksheet

After sample creation, analysts are required to decide what kinds of tests are required? Analysts choose type of test manually. Once the decision is made the analyst can see the list of tests available, and then click “*Choose Test*” hyperlink as shown in Figure 7.12. FIMS application remembers the chosen sample ID during the process.

The worksheets for the drug identification are:

- Clandestine
- Marihuana
- Tablet & Capsule
- Unknown Powder
- Unknown Liquid
- Vegetation

Figure 7.12: Choose Sample Test Section

Clandestine Laboratory Worksheet

Clandestine Laboratory worksheet is used for filling information pertaining to clandestine test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 7.13. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "Clandestine - Microsoft Internet Explorer". The address bar displays "http://localhost/Drugunit/Forms/Clandestine.aspx?SID=2006000007-P-1-1-4-S-1". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the text "User: Douglas, Date: 7/12/2006". A sidebar on the left lists navigation options: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password". The main content area is titled "Clandestine Laboratory Worksheet" and contains a "Save Results" button. Below this, the "Analysis of Evidence" section includes fields for "LabCase#:" (2006000007), "SampleID:" (2006000007-P-1-1-4-S-1), "Analyst:", and "Witness:". The "Analysis of Evidence" section also includes a table for "IR Validation:", "KBr Blank:", "Vapor Cell Blank:", "Marquis Reagent Control:", "Blank Used:", and "Blank:", all with "N/A" values. Below this, there are fields for "Form:", "pH:", "Amount:", "Marquis:", "Other:", "IR Extraction:", "Result:", "Approximate Amount Used:", "Flame Test:", "Other:", "GC/MS Extraction:", and "Result:". The bottom of the form has a "General Comments / Notes:" field.

WEST VIRGINIA STATE POLICE
FORENSIC LABORATORY
DRUG IDENTIFICATION

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Save Results

Clandestine Laboratory Worksheet

LabCase#: 2006000007 Analyst:
SampleID: 2006000007-P-1-1-4-S-1 Witness:

Analysis of Evidence

IR Validation:	KBr Blank:	Vapor Cell Blank:	Marquis Reagent Control:	Blank Used:	Blank:
N/A	N/A	N/A	N/A	N/A	N/A

Form: N/A pH:

Amount: Marquis: Other: IR Extraction: Result:

Approximate Amount Used: Flame Test: Other: GC/MS Extraction: Result:

General Comments / Notes:

Figure 7.13: Clandestine Laboratory Worksheet

Marihuana Worksheet

Marihuana worksheet is used for filling information pertaining sperm Marihuana test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 7.14. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

Marihuana - Microsoft Internet Explorer

Address: http://localhost/Drugunit/Forms/Marihuana.aspx?SID=2006000007-P-1-I-4-S-1

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Douglas, Mat J
Date: 7/12/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY
DRUG IDENTIFICATION

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Save Results

Marihuana Worksheet

LabCase#: 2006000007 Analyst:
SampleID: 2006000007-P-1-I-4-S-1 Witness:

ANALYSIS OF EVIDENCE:

Reagent Control: Positive Control: Negative Control:
N/A N/A N/A

Weight: Macroscopic: Mod. DL:
Approximate Amount Used: Microscopic: Identification:

General Comments / Notes:

Figure 7.14: Sperm Identification Worksheet

Tablet & Capsule Worksheet

Tablet & Capsule worksheet is used for filling information pertaining to tablet & capsule test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 7.15. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

TabletCapsule - Microsoft Internet Explorer

Address: http://localhost/Drugunit/Forms/TabletCapsule.aspx?SID=2006000007-P-1-1-4-S-1

User: Douglas, Date: 7/12/2006

Home | Log

FORENSIC INFORMATION MANAGEMENT SYSTEM

WEST VIRGINIA STATE POLICE

**FORENSIC LABORATORY
DRUG IDENTIFICATION**

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Save Results

Tablet and Capsule Worksheet

LabCase#: 2006000007 Analyst: _____
SampleID: 2006000007-P-1-1-4-S-1 Witness: _____

Analysis of Evidence

IR Validation:	KBr Blank:	Marquis Reagent Control:	Reagent Control:	Blank Used:	Blank:
N/A	N/A	N/A	N/A	N/A	N/A

Form: N/A

Weight:	Logo:	Other:	Extraction:	Result:

Approximate Amount Used:	Marquis Test:	Other:	GC/MS Extraction:	Result:

General Comments / Notes

Figure 7.15: Tablet & Capsule Worksheet

Unknown Powder Worksheet

Unknown Powder worksheet is used for filling information pertaining Unknown Powder test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “Save Results” button located on top of the page, as shown in Figure 7.16. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “Test Done” button. The analyst cannot make any alterations in the worksheet once the “Test Done” button is clicked.

UnknownPowder - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Go Links

Address http://localhost/Drugunit/Forms/UnknownPowder.aspx?SID=2006000007-P-1-I-4-S-1

FORENSIC INFORMATION MANAGEMENT SYSTEM

User:Do Date:7/

Save Results

Unknown Powder Worksheet

LabCase#: 2006000007 Analyst:

SampleID: 2006000007-P-1-I-4-S-1 Witness:

Analysis of Evidence

IR Validation: KBr Blank: Marquis Reagent Control: Reagent Control: Blank Used: Blank:

N/A N/A N/A N/A N/A N/A

Form: N/A

Weight: Marquis: Other: IR Extraction: Result:

Approximate Amount Used: Scott's Test: Other: GC/MS Extraction: Result:

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY DRUG IDENTIFICATION

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Done Local intranet

Figure 7.16: Unknown Powder Worksheet

Unknown Liquid Worksheet

Unknown Liquid worksheet is used for filling information pertaining to unknown liquid test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 7.17. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "UnknownLiquid - Microsoft Internet Explorer". The address bar shows a URL: `http://localhost/Drugunit/Forms/UnknownLiquid.aspx?SID=2006000007-P-1-1-4-S-1`. The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the text "WEST VIRGINIA STATE POLICE". The main content area is titled "Unknown Liquid Worksheet" and contains the following fields:

- LabCase#:** 2006000007
- Analyst:** (empty text box)
- SampleID:** 2006000007-P-1-1-4-S-1
- Witness:** (empty text box)

The "Analysis of Evidence" section contains the following fields:

- IR Validation:** N/A (dropdown)
- KBr Blank:** N/A (dropdown)
- Marquis Reagent Control:** N/A (dropdown)
- Reagent Control:** N/A (dropdown)
- Blank Used:** N/A (dropdown)
- Blank:** N/A (dropdown)
- Form:** N/A (dropdown)
- pH:** (empty text box)
- Amount:** (empty text box)
- Marquis:** (empty text box)
- Other:** (empty text box)
- IR Extraction:** (empty text box)
- Result:** (empty text box)
- Approximate Amount Used:** (empty text box)
- Flame Test:** (empty text box)
- Other:** (empty text box)
- GC/MS Extraction:** (empty text box)
- Result:** (empty text box)

The left sidebar contains the following links:

- Open Existing Case
- Item Details
- Chain Of Custody
- Send Items
- Receive Items
- Change Password

The bottom status bar shows "Done" and "Local intranet".

Figure 7.17: Unknown Liquid Worksheet

Vegetation Worksheet

Vegetation worksheet is used for filling information pertaining to vegetation test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 7.18. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

Vegetation - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Go Links

Address http://localhost/Drugunit/Forms/Vegetation.aspx?SID=2006000007-P-1-I-4-S-1

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Douglas, Mat J
Date: 7/12/2006
Home | Log Out

WEST VIRGINIA STATE POLICE

**FORENSIC LABORATORY
DRUG IDENTIFICATION**

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Save Results

Vegetation Worksheet

Lab Case#: 2006000007 Analyst:
Sample ID: 2006000007-P-1-I-4-S-1 Witness:

Analysis of Evidence

DL Reagent Control:	KBr Blank:	Marquis Reagent Control:	Reagent Control:	Blank Used:	Blank:
N/A	N/A	N/A	N/A	N/A	N/A

Weight: Macroscopic: Mod. DL:

Approximate Amount Used: Microscopic: TLC:

Other:

Done Local intranet

Figure 7.18: Vegetation Worksheet

Receive Item

Once an item is sent by CEP unit, Drug identification unit analyst is responsible for receiving it by clicking on “*Receive*” button, under receive item section, as shown in Figure 7.19. This completes the handshaking process of item transfer between units.

Figure 7.19: Receive Item Section

Send Item

After completion of item testing, analyst is required to return the evidence item back to CEP unit. Figure 7.20 shows the section used to send an item back to the CEP unit. Analyst can use the drop down to select item ID and click on “Send” hyperlink, to send item back to CEP.

Figure 7.20: Send Item Section

Chain of Custody

Item chain of custody information is shown in Figure 7.21. FIMS application records used ID, unit name, and time stamp for tracking item chain of custody.

Chain Of Custody

Item Selected: 2006000007-P-1-1-4

Item ID	Sent Unit	Sent By	Date Sent	To Unit	Received By	Date Received	Status
2006000007-P-1-1-4	Central Evidence Processing	pss	7/11/2006 9:10:28 PM	Drug Identification	drg1	7/12/2006 7:28:28 PM	Received

Figure 7.21: Item Chain Of Custody

Change User Password

Analyst can change password through this section by providing appropriate credentials as shown in Figure 7.22.

The screenshot shows a web browser window titled "Change Password - Microsoft Internet Explorer". The address bar displays "http://localhost/Drugunit/Forms/Changepass.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Douglas, Mat J" and "Date: 7/12/2006". There are links for "Home" and "Log Out". The main content area is divided into two sections. The left section, titled "WEST VIRGINIA STATE POLICE", features the state police logo and the text "FORENSIC LABORATORY DRUG IDENTIFICATION". Below this, there are links for "Open Existing Case" and "Change Password". The right section, titled "Change Password", contains a form with the following fields: "Username:" (pre-filled with "drg1"), "Old Password:", "New Password:", and "Re-enter new Password:". A "Submit" button is located below the "Re-enter new Password" field. The footer of the page indicates "©2006 Rashpal S. Ahluwalia, West Virginia University".

Figure 7.22: Change Password Section

Exiting Drug Identification

Users can terminate the current session by clicking on “*Log Out*” hyperlink on the top right corner of the page.

7.2.4 Generating Item and Sample Reports

The analyst can generate the following types of reports

- Item Report
- Item Photo Report
- Sample Report
- Sample Photo Report

Figure 7.23 shows the item report, which is a cumulative report for all the samples. This section also facilitate analyst to export report via PDF/MS-Word format, as shown in Figure 7.25 and Figure 7.26

The screenshot shows a web browser window titled "Report_ItemReport - Microsoft Internet Explorer". The address bar shows "http://localhost/Drugunit/Forms/Report_ItemReport.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Douglas, Mat J" and "Date: 7/12/2006". The left sidebar contains the "WEST VIRGINIA STATE POLICE" logo and the "FORENSIC LABORATORY DRUG IDENTIFICATION" section, with links for "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password". The main content area features a blue header bar with "Item Report" and a "powered by crystal" logo. Below this, there are three buttons: "Export Via PDF", "Export Via MSWORD", and "Print Report". The report content is divided into two columns. The left column contains the "Forensic Laboratory" logo and the "Item Report" title. The right column contains the "Biochemistry Unit" title. The report data is as follows:

Labcase Number:	2006000007	Item Description:	Scissors (Front Porch)
Package ID:	2006000007-P-1		
Item ID:	2006000007-P-1-I-4		
Sample ID:	2006000007-P-1-I-4-S-1		
Sample Description:	Sample 1		
Test Result:			

Figure 7.23: Item report

Figure 7.24 shows the sample report for clandestine laboratory test. This report can also be accessed via PDF format, as shown in Figure 7.25.

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Douglas, Mat J
Date: 7/12/2006
Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY DRUG IDENTIFICATION

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Export Via PDF **Export Via MSWORD** **Print Report**

Sample Report

1 of 1

100% powered by crystal

Forensic Laboratory
Clandestine Laboratory Report

Drug Unit

Lab Case ID: 2006000007 **Analyst:** dgl
ItemID: 2006000007-P-1-L-4 **Witness:**
SampleID: 2006000007-P-1-L-4-S-2 **Date Created:** 7/12/2006 7:35:57PM

IR Validation: **KBr Blank:** **Vapor Cell Blank:** **Marquis Reagent Control:** **Blank Used:** **Blank:**
Acceptable N/A Acceptable N/A N/A N/A

Form: **Ph:** 6

Amount: **Marquis:** **Other:** **IR Extraction:** **Result:**

Figure 7.24: Sample Report

http://localhost/Drugunit/Forms/Report_Cland.aspx?SID=2006000007-P-1-I-4-S-2 - Microsoft Internet Explorer

File Edit Go To Favorites Help

Back Forward Stop Search Favorites

Address http://localhost/Drugunit/Forms/Report_Cland.aspx?SID=2006000007-P-1-I-4-S-2

Save a Copy Print Search Select 124% Sign

Forensic Laboratory

Clandestine Laboratory Report

Drug Unit

Lab Case ID:	2006000007	Analyst:	drg1	
ItemID:	2006000007-P-1-I-4	Witness:		
SampleID:	2006000007-P-1-I-4-S-2	Date Created:	7/12/2006 7:35:57PM	

IR Validation:	KBr Blank:	Vapor Cell Blank:	Marquis Reagent Control:	Blank Used:	Blank:
Acceptable	N/A	Acceptable	N/A	N/A	N/A

Form:	Ph:	6			
Solid					

Amount:	Marquis:	Other:	IR Exatraction:	Result:
4				

1 of 1

Done Unknown Zone

Figure 7.25: Item Report in PDF Format

http://localhost/Drugunit/Forms/Report_Cland.aspx?SID=2006000007-P-1-I-4-S-2 - Microsoft Internet Explorer

File Edit View Insert Format Tools Go To Favorites Help

Back Forward Stop Search Favorites

Address http://localhost/Drugunit/Forms/Report_Cland.aspx?SID=2006000007-P-1-I-4-S-2

Final Showing Markup Show

Forensic Laboratory

Clandestine Laboratory Report

Drug Unit

Lab Case ID:	2006000007	Analyst:	drg1	
ItemID:	2006000007-P-1-I-4	Witness:		
SampleID:	2006000007-P-1-I-4-S-2	Date Created:	7/12/2006 7:35:57PM	

IR Validation:	KBr Blank:	Vapor Cell Blank:	Marquis Reagent Control:	Blank Used:	Blank:
Acceptable	N/A	Acceptable	N/A	N/A	N/A

Form:	Ph:	6			
Solid					

Amount:	Marquis:	Other:	IR Exatraction:	Result:
4				

Approximate Amonut Used:	Flame Test:	Other:	GC/MS Extraction:
2			

1 of 1

Unknown Zone

Figure 7.26: Item Report in MS Word Format

CHAPTER 8

TRACE EVIDENCE

8.1 Existing Trace Evidence Process

The Trace Evidence Unit is responsible for arson analysis, glass comparison/analysis, gunshot residue analysis, lamp analysis, paint comparison/analysis, speed determinations from speedometers, and various other types of analyses involving identifications, physical matches, and comparisons. The trace evidence unit has a valuable resource at its disposal, called the Paint Database Query (PDQ). This is a national and international database consisting of automotive paint data. For example, this database can be used to determine the make, model, and year of an automobile from a sample of paint found at the crime scene. The analyst in the trace evidence unit receives the LEIF form and chain of custody form along with the evidence items. Samples are prepared from the items received from the storage. After the tests are performed, appropriate forms are completed. The forms/worksheets used by this unit are: Paint Comparison (PC), Gun Shot Residue (GSR), Speedometer Examination (SE), Glass Comparison (GC), Ignitable Liquid (IL), and Miscellaneous Comparison (MC). Once the examinations are completed, evidence is returned to the CER and the secretary prepares a draft report. The draft report is reviewed by the analyst/reviewer. After approval, the final report is sent to CER. Figure 8.1 shows the existing process for the trace evidence unit

Figure 8.1: Existing Trace Evidence Process

8.2 Re-engineering the Trace Evidence Process

The analyst in the trace evidence unit receives the items assigned for further processing and analysis from CEP. Received items are sub-divided into samples for conducting the requested tests. An individual item may be divided into many samples according to the requirement and complexity of the required test. A report for each sample is generated. An item report is compiled by combining sample reports. After the report is received, the reports along with the test items are sent back to CEP for further processing. The evidence and information flow diagram is shown in Figure 8.2.

Figure 8.2: Step 5 Receive Assigned Items from CEP

Detail procedure followed by trace evidence unit for further processing and analysis is shown in Figure 8.3.

Figure 8.3: Detail Item Processing Procedure

8.2.1 Trace Evidence Entity Relationship Diagram

CEP data tables are connected with each other through relations as shown in the figure 8.4.

Figure 8.4: Entity Relationship Diagram

8.2.2 Trace Evidence Data Tables

The trace evidence unit module stores its data in the following tables

- Glass Comparison Worksheet(tbl_TRE_Glasscom_worksheet)
- Gun shot worksheet-A(tbl_TRE_GunshotStA_worksheet)
- Gun shot Worksheet-B(tbl_TRE_GunshotStB_worksheet)
- Ignitable Worksheet(tbl_TRE_Ignitable_worksheet)
- Lamp Examination Worksheet(tbl_TRE_LampExam_worksheet)
- Miscellaneous Comparison Worksheet(tbl_TRE_MisceComp_worksheet)
- Paint Comparison Analysis worksheet(tbl_TRE_PaintCompAnlsys_worksheet)
- Speedometer Examination Worksheet(tbl_TRE_SpeedoExam_worksheet)

- The various fields of the glass comparison worksheet table are shown in Table 8-
1. Glass Comparison worksheet data is stored and maintained in this data table

Table 8-1: Glass Comparison Worksheet Table

tbl_TRE_Glasscom_worksheet
LabCaseID
	ItemID
	SampleID
	Analyst
	Witness
	LeicaMz
	Descript
	Color
	Thinkness
	PhyMatch
	InsufSampletext
	Attempted
	Obtainedwith
	Obtainedwithtext
	BlackLight
	Longwave
	Grim2
	Oiltype
	Ri
	Notes
	Wavelength
	Mettler
	Density
	Camscantra
	Elelments
	TescanOxford
	EmtsPresnt
	DateCreated
	Comments
	TestResult

The various fields of the gun shot -A worksheet table are shown in Table 8-2.
Gun shot – A worksheet data is stored and maintained in this data table

Table 8-2: Gun Shot –A Worksheet Table

tbl_TRE_GunshotStA_Worksheet
LabCaseID
ItemID
SampleID
Analyst
Witness
Identif
Kittype
Kinderp
Wvsp
Other
Numbkits
TotalNum
Kitseal
Vialseal
Otherdetails
Placed
CkSEMEDS
CheckEDS
Precaution
Sketch
Remov
Micro
Notes
Tescan
Camscan
DateCreated
Comments
TestResult

The various fields of the gun shot –B worksheet table are shown in Table 8-3.
Gun shot –B worksheet data is stored and maintained in this data table

Table 8-3: Gun Shot –B Worksheet Table

tbl_TRE_GunshotStB_Worksheet
LabCaseID
ItemID
SampleID
Analyst
Witness
Microscope
Elements
TescanOxford
Camscantra
DateCreated
Comments
TestResult

The various fields of ignitable worksheet the worksheet table are shown in Table 8-4. Ignitable worksheet data is stored and maintained in this data table

Table 8-4: Ignitable Worksheet Table

tbl_TRE_Ignitable_Worksheet
LabCaseID
ItemID
SampleID
Analyst
Witness
GcandMs
C65for
Other
Other text
C90for
Nadil
Nadil text
Container
Contents
Odor
Technique
Results
DateCreated
Comments
TestResult

- The various fields of the lamp examination worksheet table are shown in Table 8-
1. Lamp examination worksheet data is stored and maintained in this data table

Table 8-5: Lamp Examination Worksheet Table

tbl_TRE_LampExam_Worksheet
LabCaseID
	ItemID
	SampleID
	Analyst
	Witness
	Macroscope
	Continuity
	Microscope
	LeicaMz
	DateCreated
	Comments
	TestResult

The various fields of the miscellaneous worksheet table are shown in Table 8-1.
Miscellaneous worksheet data is stored and maintained in this data table

Table 8-6: Miscellaneous Worksheet Table

tbl_TRE_MisceComp_Worksheet
LabCaseID
	ItemID
	SampleID
	Analyst
	Witness
	Attempted
	Obtainedwith
	Obtainedwithtext
	PhysicInsuff
	PhyInsufText
	Macroscope
	Microscope
	LeicaMz
	ChemInsufSam
	ChemInsufText
	Ph
	PhText
	ChemTests
	ChemTestText
	Solubty
	SolubtyText
	Agilesnt
	Pyroprob
	Continum
	OrganicText
	Camscantra
	TescanOxford
	InorganicText
	DateCreated
	Comments
	TestResult

The various fields of the paint comparison analysis worksheet table are shown in Table 8-1. Paint comparison analysis worksheet data is stored and maintained in this data table

Table 8-7: Paint Comparison Analysis Worksheet Table

tbl_TRE_PaintCompAnsys_worksheet
LabCaseID
	ItemID
	SampleID
	Analyst
	Witness
	Macroscop
	Attempted
	Obtainedwith
	Obtainedwithtext
	InsufSample
	InsufSampletext
	LeicaMz
	Microscop
	ChemInsufSamp
	ChemInsufText
	MethChloride
	MethChltext
	Acetone
	AcetoneText
	Other
	OtherText
	DiphInsuffSam
	DiphinsufSamtext
	Reaction
	Neg
	Positive
	Pyrop
	Cont
	OrgText
	Camscan
	Tescan
	InorgText
	DateCreated
	Comments
	TestResult

The various fields of the speedometer examination worksheet table are shown in Table 8-1. Speedometer examination worksheet data is stored and maintained in this data table

Table 8-8: Speedometer Examination Worksheet Table

tbl_TRE_SpeedoExam_Worksheet
LabCaseID
ItemID
SampleID
Analyst
Witness
Macroscope
Microscope
LeicaMz
Uvfluor
BlackLight
AlterLight
Luma
DateCreated
Comments
TestResult

8.2.3 Working with Trace Evidence

Trace Evidence home page requires username and password to verify user credentials, as shown in the Figure 8.5. After verifying credentials, a user is directed to list of items assigned to him/her for further processing.

Figure 8.5: Trace Evidence Home Page

View Items Assigned

Figure 8.6 shows the list of items assigned to the analyst by the laboratory administration unit for further analysis. Initially, job status for the item assigned is set to “*Job Pending*”. The “*View Details*” hyperlink enables an analyst to view the details of the case. If the list of items assigned grows to more than 15 items, the record set is divided into multiple pages. Analysts can navigate between different pages by clicking on the header and footer navigation bar of the list.

The screenshot displays a web application titled "AssignedItemsList - Microsoft Internet Explorer". The browser's address bar shows the URL "http://localhost/TraceEvidence/Forms/AssignedItemsList.aspx". The application header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User:Owen, Jane L" and "Date:7/12/2006". Below the header, the left sidebar identifies the user as "WEST VIRGINIA STATE POLICE" and "FORENSIC LABORATORY TRACE EVIDENCE", with links for "Open Existing Case" and "Change Password". The main content area, titled "List of Item(s)Assigned", displays a table with two rows of assigned items. The table has columns for "LabCase #", "Item ID", "Date Assigned", and "Test Status". Each row also includes a "View Details" link. The first row shows LabCase # 2006000004, Item ID 2006000004-P-1-1-1, Date Assigned 6/9/2006, and Test Status Job Pending. The second row shows LabCase # 2006000007, Item ID 2006000007-P-2-1-2, Date Assigned 7/11/2006, and Test Status Job Pending. The footer of the application shows the copyright notice "©2006 Rashpal S. Ahluwalia, West Virginia University" and the "Local intranet" status.

LabCase #	Item ID	Date Assigned	Test Status	
2006000004	2006000004-P-1-1-1	6/9/2006	Job Pending	View Details
2006000007	2006000007-P-2-1-2	7/11/2006	Job Pending	View Details

Figure 8.6: Assigned Item List

Item Picture Management

This section describes the procedure of attaching pictures to an item. Analysts can perform two kinds of operation:

- View Pictures
- Upload Pictures

Analysts can access this section by clicking on the “*View/Upload Item Photo*” hyperlink in the item details section as shown in Figure 8.9. View picture section list the pictures already attached to the item with their thumbnails as shown in Figure 8.7. Analysts can also view the full size image by clicking on the image thumbnail. Full size image opens in a new window, which can be closed after use.

Figure 8.7: View Item Photo

Analysts can upload any digital photo in JPG format directly into the database using this section as shown in Figure 8.8. To upload an image into database, analysts are required to browse for the image path, set other required fields and click on the “*Upload the file*” hyperlink. On successful upload a thumbnail appears on the bottom of the page with a success message.

Figure 8.8: Upload Item Picture Section

Working with Samples

Analysts receive items from the CEP unit for further analysis and processing. Once received items are sub-divided into samples for conducting requested tests. Each item is divided into one or more samples according to the requirement and complexity of the required test.

Analysts can create new, update or delete existing samples from the item details section as shown in Figure 8.9. To add a new sample analyst is required to provide description of sample and then click on “*Add Sample*” hyperlink. FIMS application automatically adds the time stamp to the item created. Initially, sample test status is set to “*Test Pending*” for the sample. Sample information can be updated by clicking on “*Edit*” hyperlink and existing sample can be deleted from the system by clicking on “*Delete*” hyperlink.

This section also enables analysts to view the final sample, sample photo, item, and item photo report. To access the individual sample/sample photo report analyst can click on “*View Report*” or “*Photo Sheet*” hyperlink. To view comprehensive item report analysts can click on “*Item Report*” or “*Item Photo Report*” at the bottom of the page.

To complete the process for item testing, the analyst is required to click on “*Item Test Complete*” button, as shown in Figure 8.9. Once clicked, analyst will not be able to make any alterations to the existing item test report.

WEST VIRGINIA STATE POLICE
FORENSIC LABORATORY
TRACE EVIDENCE

Open Existing Case
 Item Details
 Chain Of Custody
 Send Items
 Receive Items
 Change Password

Create/View Sample for Item

LabCase#: 2006000007
 Item ID: 2006000007-P-2-I-2
 Item Name: Hammer
 Item Description: Hammer (Iron)
 Exam Requested: Tool Mark Identification

Upload Item Photo
 View/Upload Item Photos

List of Samples (Test Pending / In process)

Edit	Sample ID	Sample Description	Date Created	Test Status
Delete Edit	2006000007-P-2-I-2-S-2	Sample 2	7/12/2006 7:47:06 PM	Test Pending Choose Add Test Photo
Delete Edit	2006000007-P-2-I-2-S-3	Sample 3	7/12/2006 7:47:12 PM	Test Pending Choose Add Test Photo

Add Sample

List of Samples (Test Done)

Sample ID	Sample Description	Date Created	Test Status
2006000007-P-2-I-2-S-1	Sample 1	7/12/2006 7:46:55 PM	Test Done View Result Photo Sheet

List of Item Report(s)
 View Item Report

Figure 8.9: Item Detail Section

Analysts can upload any digital photo in JPG format directly into the database using this section as shown in Figure 8.10 To upload an image analysts are required to browse for the image path, set other required fields and click on the “*Upload the file*” hyperlink to upload the image into database. On successful upload a thumbnail appears on the bottom of the page with a success message.

SamplePhoto - Microsoft Internet Explorer

Address: http://localhost/Traceevidence/Forms/SamplePhoto.aspx?SID=2006000007-P-2-I-2-S-1

FORENSIC INFORMATION MANAGEMENT SYSTEM

User:Owen, Jane L
Date:7/12/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY
TRACE EVIDENCE

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

View Pictures Upload Pictures

Photo Notes Sheet

LabCase#: 2006000007
Item ID: 2006000007-P-2-I-2
Sample ID: 2006000007-P-2-I-2-S-1
Select File : Browse...
File Name:
Notes:
Upload the files >
Image file uploaded

©2006 Rashpal S. Ahluwalia, West Virginia University

Local intranet

Figure 8.10: Upload Sample Picture Section

Choosing Test Worksheet

After sample creation, analysts are required to decide what kinds of tests are required? Analysts are required to make decision of choosing type of test manually. Once the decision is made the analyst can see the list of tests available, and then click “*Choose Test*” hyperlink as shown in Figure 8.11. FIMS application remembers the chosen sample ID during the process.

The worksheet for trace evidence unit are:

- Speedometer examination
- Glass comparison
- Gunshot residue analysis
- Ignitable liquid
- Lamp examination
- Miscellaneous comparison
- Paint comparison and analysis

Figure 8.11: Choose Sample Test Section

Speedometer Examination Worksheet

Speedometer Examination worksheet is used for filling information pertaining to speedometer examination test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 8.12. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "SpeedometerExamination - Microsoft Internet Explorer". The address bar displays "http://localhost/TraceEvidence/Forms/SpeedometerExamination.aspx?SID=2006000007-P-2-I-2-S-1". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the text "User:Owen, Jane L Date:7/12/2006". A "Home | Log Out" link is also present. The main content area is titled "WEST VIRGINIA STATE POLICE" and "FORENSIC LABORATORY TRACE EVIDENCE". It features a "Save Results" button and a "Speedometer Examination" section. The form contains fields for "Labcasenumber: 2006000007", "Analyst:", "SampleID: 2006000007-P-2-I-2-S-1", and "Witness:". Below these are sections for "MACROSCOPIC EXAMINATION:", "MICROSCOPIC EXAMINATION:", "UV FLUORESCENCE:", and "ALTERNATIVE LIGHT SOURCE:". Each section has a dropdown menu and a text input field. The "MICROSCOPIC EXAMINATION:" section is set to "Yes" and "LEICA MZ 12.5 STEREOSCOPE 8X-100X". The "UV FLUORESCENCE:" section is set to "Yes" and "BLACK LIGHT EASTER SPECTROLINE MODEL C3F". The "ALTERNATIVE LIGHT SOURCE:" section is set to "Yes" and "LUMA LITE". A "Done" button is located at the bottom left of the page.

SpeedometerExamination - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address http://localhost/TraceEvidence/Forms/SpeedometerExamination.aspx?SID=2006000007-P-2-I-2-S-1 Go Links

FORENSIC INFORMATION MANAGEMENT SYSTEM

User:Owen, Jane L
Date:7/12/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY
TRACE EVIDENCE

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Save Results

Speedometer Examination

Labcasenumber: 2006000007 Analyst:
SampleID: 2006000007-P-2-I-2-S-1 Witness:

MACROSCOPIC EXAMINATION:
[Text Box]

MICROSCOPIC EXAMINATION: Yes LEICA MZ 12.5 STEREOSCOPE 8X-100X
[Text Box]

UV FLUORESCENCE: Yes BLACK LIGHT EASTER SPECTROLINE MODEL C3F
[Text Box]

ALTERNATIVE LIGHT SOURCE: Yes LUMA LITE

Done

Local intranet

Figure 8.12: Speedometer Examination worksheet

Glass Comparison Worksheet

Glass Comparison worksheet is used for filling information pertaining to Glass Comparison test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 8.13. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

GlassComparison - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address <http://localhost/TraceEvidence/Forms/glassComparison.aspx?SID=2006000007-P-2-I-2-S-1> Go Links

FORENSIC INFORMATION MANAGEMENT SYSTEM

User:Owen, Jane L
Date:7/12/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY TRACE EVIDENCE

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Save Results

Glass Comparison and Analysis

Lab Case ID: 2006000007 Analyst:
SampleID: 2006000007-P-2-I-2-S-1 Witness:

MACROSCOPIC/MICROSCOPIC EXAMINATION: Yes LEICA MZ 12.5 STEREOSCOPE 8X-100X

DESCRIPTION COLOR THICKNESS

PHYSICAL MATCH: ☐ INSUFFICIENT SAMPLE If Yes Reason

ATTEMPTED Yes

OBTAINED WITH ITEMS (S): Yes

UV FLUORESCENCE: Yes BLACK LIGHT EASTER SPECTROLINE MODEL C3F Long Wave

REFRACTIVE INDEX MEASUREMENT: GRIM 2 Yes

Figure 8.13: Glass Comparison Worksheet

Gun Shot Residue Worksheet

Gun Shot Residue worksheet is used for filling information pertaining to gun shot residue test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 8.14. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

GunshotResidueAnalysis - Microsoft Internet Explorer

Address: http://localhost/TraceEvidence/Forms/GunshotResidueAnalysis.aspx?SID=2006000007-P-2-1-2-S-1

FORENSIC INFORMATION MANAGEMENT SYSTEM

User:Owen, Jane L
Date:7/12/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY TRACE EVIDENCE

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Save Results

Gunshot Residue Analysis

Lab Case ID: 2006000007 Analyst:
SampleID: 2006000007-P-2-1-2-S-1 Witness:

EVIDENCE DESCRIPTION:

☐ IDENTIFICATION PLACED ON EACH ITEM,PACKAGE,KIT,AND/OR VIAL(S)

KIT TYPE: Type1 KINDERPRINT ☐ WVSP ☐ OTHER

NUMBER OF KITS: TOTAL NUMBER OF VIALS:

SAMPLECONDITION:

KIT: SEALED VAIL: SEALED OTHER:

GSR CHECKLIST:

☐ PLACED EVIDENCE IN THE LOCKER FOR STORAGE
☐ CHECK SEM/EDS OPERATING CONDITIONS
☐ CHECK EDS CALIBRATION

Done Local intranet

Figure 8.14: Gun Shot Residue Worksheet

Gun Shot Residue-B Worksheet

Gun Shot Residue-B worksheet is used for filling information pertaining to gun shot residue-B test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 8.15. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

GunshotResidueAnalysisSheetB - Microsoft Internet Explorer

Address: http://localhost/TraceEvidence/Forms/GunshotResidueAnalysisSheetB.aspx?SID=2006000007-P-2-1-2-S-1

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Owen, Jane L
Date: 7/12/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY
TRACE EVIDENCE

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Save Results

Gunshot Residue Analysis-B

Lab Case ID: 2006000007 Analyst:
SampleID: 2006000007-P-2-1-2-S-1 Witness:

GSR ANALYSIS SUMMARY:

☐ MICROSCOPIC(8X LEICA MZ 12.5 STEREOSCOPE) NOTES:
☐ TESCAN/OXFORD ☐ CAMSCAN/TRACOR

General Comments:

Test Result:

Test Done

Done Local intranet

Figure 8.15: Gun Shot Residue-B Worksheet

Ignitable Liquid Worksheet

Ignitable liquid worksheet is used for filling information pertaining to Ignitable liquid test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 8.16. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

Ignitableliquid - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address http://localhost/Traceevidence/Forms/Ignitableliquid.aspx?SID=2006000007-P-2-I-2-S-1 Go Links >>

FORENSIC INFORMATION MANAGEMENT SYSTEM

User:Owen, Jane L
Date:7/12/2006
Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY TRACE EVIDENCE

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Save Results

Ignitable Liquid

Lab Case ID: 2006000007 Analyst:
SampleID: 2006000007-P-2-I-2-S-1 Witness:
GC/MS METHOD:
EXTRACTION TIME AND TEMPERATURE:
☐ -65 C FOR 16 HOURS ☐ OTHER:
☐ -90 C FOR 30 HOURS ☐ NA-DILUTION:
Container
Contents
Order
Technique
Results
General Comments:

Figure 8.16: Ignitable Liquid Worksheet

Lamp Examination Worksheet

Lamp examination worksheet is used for filling information pertaining to Lamp examination test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 8.17. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "LampExamination - Microsoft Internet Explorer". The address bar displays the URL: `http://localhost/TraceEvidence/Forms/LampExamination.aspx?SID=2006000007-P-2-I-2-S-1`. The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information: "User: Owen, Jane L" and "Date: 7/12/2006". There are links for "Home" and "Log Out".

The main content area is titled "Lamp Examination" and contains the following fields and buttons:

- Save Results** button
- Lab Case ID:** 2006000007
- SampleID:** 2006000007-P-2-I-2-S-1
- Analyst:** (text input field)
- Witness:** (text input field)
- MACROSCOPIC EXAMINATION:** (dropdown menu)
- CONTINUITY:** (dropdown menu)
- MICROSCOPIC EXAMINATION:** (dropdown menu) with a "Yes" button and the text "LEICA MZ 12.5 STEREOSCOPE 8X-100X"
- General Comments:** (text area)
- Test Result:** (text area)

The left sidebar contains the "WEST VIRGINIA STATE POLICE" logo and the "FORENSIC LABORATORY TRACE EVIDENCE" text. Below this, there is a list of links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password".

Figure 8.17: Lamp Examination worksheet

Miscellaneous Comparison Worksheet

Miscellaneous comparison worksheet is used for filling information pertaining to miscellaneous comparison test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 8.18. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

MiscellaneousComparisonandAnalysis - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address http://localhost/TraceEvidence/Forms/MiscellaneousComparisonandAnalysis.aspx?SID=2006000007-P-2-1-2-5-1 Go Links

FORENSIC INFORMATION MANAGEMENT SYSTEM

User:Owen, Jane L
Date:7/12/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY TRACE EVIDENCE

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Miscellaneous Comparison and Analysis

Save Results

Lab Case ID: 2006000007 Analyst:

SampleID: 2006000007-P-2-1-2-5-1 Witness:

PHYSICAL MATCH: Yes ATTEMPTED

Yes OBTAINED WITH ITEMS(S):

☐ INSUFFICIENT SAMPLE: If Yes Reason

MACROSCOPIC EXAMINATION:

MICROSCOPIC EXAMINATION: Yes LEICA MZ 12.5 STEREOSCOPE 8X-100X

CHEMICAL EXAMINATIONS:

Done Local intranet

Figure 8.18: Miscellaneous Comparison Worksheet

Paint Comparison and Analysis Worksheet

Paint comparison and analysis worksheet is used for filling information pertaining to paint comparison and analysis test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 8.19. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "PaintComparisonandAnalysis - Microsoft Internet Explorer". The address bar shows the URL: `http://localhost/TraceEvidence/Forms/PaintComparisonandAnalysis.aspx?SID=2006000007-P-2-I-2-S-1`. The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information: "User: Owen, Jane L" and "Date: 7/12/2006". There are links for "Home" and "Log Out".

The main content area is titled "Paint Comparison and Analysis" and contains the following fields and buttons:

- Save Results** button
- Labcasenumber:** 2006000007
- Analyst:** (empty field)
- SampleID:** 2006000007-P-2-I-2-S-1
- Witness:** (empty field)
- MACROSCOPIC EXAMINATION:** (empty field)
- PHYSICAL MATCH:** ☒ Yes ☐ No
- ATTEMPTED** (empty field)
- OBTAINED WITH ITEM(S):** (empty field)
- INSUFFICIENT SAMPLE:** ☐ (empty field)
- If Yes Reason** (empty field)
- MICROSCOPIC EXAMINATION:** ☒ Yes ☐ No
- LEICA MZ 12.5 STEREOSCOPE 8X-100X** (empty field)
- CHEMICAL SOLUBILITIES:** (empty field)
- INSUFFICIENT SAMPLE** (empty field)

The left sidebar contains the "WEST VIRGINIA STATE POLICE" logo and the "FORENSIC LABORATORY TRACE EVIDENCE" text. Below this, there are links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password".

Figure 8.19: Paint comparison and analysis worksheet

Receive Item

Once an item is sent by CEP unit, Trace Evidence unit analyst is responsible for receiving it by clicking on “*Receive*” button, under receive item section, as shown in Figure 8.20. This completes the handshaking process of item transfer between units.

Figure 8.20: Receive Item Section

Send Item

After completion of item testing, analyst is required to return the evidence item back to CEP unit. Figure 8.21 shows the section used to send an item back to the CEP unit. Analyst can use the drop down to select item ID and click on “Send” hyperlink, to send item back to CEP.

Figure 8.21: Send Item Section

Chain of Custody

Item chain of custody information is shown in Figure 8.22. FIMS application records used ID, unit name, and time stamp for tracking item chain of custody.

Item ID	Sent Unit	Sent By	Date Sent	To Unit	Received By	Date Received	Status
2006000007-P-2-I-2	Central Evidence Processing	ps	7/11/2006 9:10:39 PM	Trace Evidence	tre1	7/12/2006 7:44:19 PM	Received
2006000007-P-2-I-2	Trace Evidence	tre1	7/12/2006 7:44:23 PM	Central Evidence Receiving			Not Received

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Figure 8.22: Item Chain Of Custody

Change User Password

Analyst can change password through this section by providing appropriate credentials as shown in Figure 8.23.

The screenshot shows a web browser window titled "Change Password - Microsoft Internet Explorer". The address bar displays "http://localhost/Traceevidence/Forms/Changepass.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the text "User:Owen, Jane L Date:7/12/2006". Below the header, there is a sidebar for "WEST VIRGINIA STATE POLICE FORENSIC LABORATORY TRACE EVIDENCE" with a logo and links for "Open Existing Case" and "Change Password". The main content area is titled "Change Password" and contains a form with the following fields: "Username:" (pre-filled with "tre1"), "Old Password:" (text input), "New Password:" (text input), and "Re-enter new Password:" (text input). A "Submit" button is located below the "Re-enter new Password" field. At the bottom of the page, there is a copyright notice: "©2006 Rashpal S. Ahluwalia, West Virginia University".

Figure 8.23: Change password section

Exiting Trace Evidence

Users can terminate the current session by clicking on “*Log Out*” hyperlink on the top right corner of the page.

8.2.4 Generating Item and Sample Reports

The analyst can generate the following types of reports

- Item Report
- Item Photo Report
- Sample Report
- Sample Photo Report

Figure 8.24 shows the item report, which is a cumulative report for all the samples. This section also facilitate analyst to export report via PDF/MS-Word format as shown in Figure 8.26 and Figure 8.27.

Figure 8.24: Item report

Figure 8.25 shows the sample report. This section also facilitate analyst to photo report, as shown in Figure 8.26.

Report_ItemPhoto - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Go Links

Address http://localhost/Traceevidence/Forms/Report_Glass.aspx?SID=2006000007-P-2-I-2-S-1

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Owen, Jane L
Date: 7/12/2006
Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY TRACE EVIDENCE

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Export Via PDF **Export Via MSWORD** **Print Report**

Item Photo Report

1 of 3 100% powered by crystal

Forensic Laboratory **Trace Evidence**

Glass Comparison and Analysis Report

Lab Case ID:	2006000007	Analyst:	tre1
Item ID:	2006000007-P-2-I-2	Witness:	Parmjit Singh
Sample ID:	2006000007-P-2-I-2-S-1	Date Created:	

Done Local intranet

Figure 8.25: Sample Report

http://localhost/Traceevidence/Forms/Report_Glass.aspx?SID=2006000007-P-2-I-2-S-1 - Microsoft Internet Explorer

File Edit Go To Favorites Help

Back Forward Stop Search Favorites

Address http://localhost/Traceevidence/Forms/Report_Glass.aspx?SID=2006000007-P-2-I-2-S-1

Save a Copy Search Select 124% Sign

Pages

Forensic Laboratory

Glass Comparison and Analysis Report

Trace Evidence

Lab Case ID: 2006000007 **Analyst:** tre1
Item ID: 2006000007-P-2-I-2 **Witness:** Parmjit Singh
Sample ID: 2006000007-P-2-I-2-S-1 **Date Created:**

MACROSCOPIC/MICROSCOPIC EXAMINATION: : **LEICA MZ 12.5 STEREOSCOPE 8X-100X:** Yes
DESCRIPTION: **COLOR:** **THICKNESS:**
Red
PHYSICAL MATCH: No **INSUFFICIENT SAMPLE:** **If Yes Reason:**
ATTEMPTED: Yes

2 of 3

Done Unknown Zone

Figure 8.26: Item Report in PDF Format

http://localhost/Traceevidence/Forms/Report_Glass.aspx?SID=2006000007-P-2-I-2-S-1 - Microsoft Internet Explorer

File Edit View Insert Format Tools Go To Favorites Help

Back Forward Stop Search Favorites

Address http://localhost/Traceevidence/Forms/Report_Glass.aspx?SID=2006000007-P-2-I-2-S-1

100% Read Final Showing Markup Show

2 1 3 4 5 6

Forensic Laboratory

Glass Comparison and Analysis Report

Trace Evidence

Lab Case ID: 2006000007 **Analyst:** tre1
Item ID: 2006000007-P-2-I-2 **Witness:** Parmjit Singh
Sample ID: 2006000007-P-2-I-2-S-1 **Date Created:**

MACROSCOPIC/MICROSCOPIC EXAMINATION: : **LEICA MZ 12.5 STEREOSCOPE 8X-100X:** Yes
DESCRIPTION: **COLOR:** **THICKNESS:**
Red
PHYSICAL MATCH: No **INSUFFICIENT SAMPLE:** **If Yes Reason:**
ATTEMPTED: Yes
OBTAINED WITH ITEM(S): Yes
UV FLUORESCENCE: Yes **BLACK LIGHT EASTER SPECTROLINE MODEL C3F:** Long Wave
REFRACTIVE INDEX MEASUREMENT:

Unknown Zone

Figure 8.27: Item Report in MS Word Format

Figure 8.28: Item Photo Report

CHAPTER 9

TOXICOLOGY

9.1 Existing Toxicology Process

The Toxicology Unit performs alcohol and drug analysis on blood and urine samples taken from subjects believed to be driving under the influence. The samples submitted to the lab are analyzed using gas chromatography for alcohol and gas chromatography/mass spectrometry for drugs. The toxicology unit performs drug screens on blood or urine specimens at the request of the arresting officer or at any time the blood alcohol level is below 0.10% blood alcohol by weight. The duties performed by the toxicology unit can be broken down into three primary areas: (1) Breath Alcohol, (2) Blood Alcohol, and (3) Drug Toxicology. The analyst in the toxicology unit receives the LEIF form and chain of custody form along with the evidence items. Samples are prepared from the items received from the storage. The analyst then performs the required tests and completes the appropriate forms. The forms/worksheets used by the toxicology unit are: Drug Analysis (DA), and Toxicology Worksheet (TW). Once the examinations are performed, evidence is returned to the CER and the secretary prepares a draft report. The draft report is reviewed by the analyst/reviewer. After approval the final report is sent to CER. Figure 9.1 shows the existing process for the toxicology unit

Figure 9.1: Existing Process for Toxicology Unit

9.2 Re-engineering the Toxicology Process

The analyst in the toxicology unit receives the items assigned for further processing and analysis from CEP. Received items are sub-divided into samples for conducting the requested tests. An individual item may be divided into many samples according to the requirement and complexity of the required test. A report for each sample is generated. An item report is compiled by combining sample reports. After the report is received, the reports along with the test items are sent back to CEP for further processing. The evidence and information flow diagram is shown in Figure 9.2.

Figure 9.2: Step 5 Receive Assigned Items from CEP

Detail procedure followed by toxicology unit for further processing and analysis is shown in Figure 9.3.

Figure 9.3: Detail Item Processing Procedure

9.2.1 Toxicology Entity Relationship Diagram

Toxicology data tables are connected with each other through relations as shown in the figure 9.4.

Figure 9.4: Entity Relationship Diagram

9.2.2 Toxicology Database Tables

The Toxicology unit module stores its data in the following table:

- Drug analysis (tbl_ToX_DrugAnalysisSheet)

The various fields of the worksheet table are shown in Table 9-1. Worksheet data is stored and maintained in this data table

Table 9-1: Drug Analysis Table

tbl_TOX_DrugAnalysisSheet	
⚠	LabCaseID
⚠	ItemID
⚠	SampleID
	IDLocation
	Analyst
	Witness
	DASample
	Barbiturates
	Benzodizepines
	CocaineMeta
	THCMeta
	Opiate
	Amphetamine
	Propox
	PCP
	TCA
	BasicExtr_Dt
	AcidNeuExtr_Dt
	Benzo_Dt
	TITC_Dt
	Cocaine_Dt
	Other_Dt
	BasicExtr_Spl
	AcidNeuExtr_Spl
	Benzo_Spl
	TITC_Spl
	Cocaine_Spl
	Other_Spl
	BasicExtr_R
	AcidNeuExtr_R
	Benzo_R
	TITC_R
	Cocaine_R
	Other_R
	DateCreated
	Comments
	Results

9.2.3 Working with Toxicology

Toxicology home page requires username and password to verify user credentials, as shown in the Figure 9.5. After verifying credentials, a user is directed to list of items assigned to him/her for further processing.

Figure 9.5: Toxicology Home Page

View Items Assigned

Figure 9.6 shows the list of items assigned to the analyst by the laboratory administration unit for further analysis. Initially, job status for the item assigned is set to “Job Pending”. The “View Details” hyperlink enables an analyst to view the details of the case. If the list of items assigned grows long i.e. more than 15 items, the record set is divided into multiple pages. Analysts can navigate between different pages by clicking on the header and footer navigation bar of the list.

The screenshot shows a web application titled "AssignedItemsList - Microsoft Internet Explorer". The address bar shows "http://localhost/Toxicology/Forms/AssignedItemsList.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Clinton, Marry L. Date: 7/12/2006". The sidebar on the left displays the "WEST VIRGINIA STATE POLICE" logo and the text "FORENSIC LABORATORY TOXICOLOGY". Below the logo are links for "Open Existing Case" and "Change Password". The main content area is titled "List of Item(s) Assigned" and contains a table with the following data:

LabCase #	Item ID	Date Assigned	Test Status
2006000004	2006000004-P-1-1-6	6/9/2006	Job Pending
2006000004	2006000004-P-2-1-2	6/9/2006	Job Pending
2006000007	2006000007-P-2-1-1	7/11/2006	Job Pending

The footer of the page shows the copyright notice "©2006 Rashpal S. Ahluwalia, West Virginia University" and the text "Local intranet".

Figure 9.6: Assigned Item List

Item Picture Management

This section describes the procedure of attaching pictures to an item. Analysts can perform two kinds of operation:

- View Pictures
- Upload Pictures

Analysts can access this section by clicking on the “*View/Upload Item Photo*” hyperlink in the item details section as shown in Figure 9.9. View picture section list the pictures already attached to the item with their thumbnails. Analysts can also view the full size image by clicking on the image thumbnail. Full size image opens in a new window, which can be closed after use.

Figure 9.7: View Item Photo

Analysts can upload any digital photo in JPG format directly into the database using this section as shown in Figure 9.8. To upload an image into database, analysts are required to browse for the image path, set other required fields and click on the “*Upload the file*” hyperlink. On successful upload a thumbnail appears on the bottom of the page with a success message.

Figure 9.8: Upload Item Picture Section

Working with Samples

Analysts receive items from the CEP unit for further analysis and processing. Once received items are sub-divided into samples for conducting requested tests. Each item is divided into one or more samples according to the requirement and complexity of the required test.

Analysts can create new, update or delete existing samples from the item details section as shown in Figure 9.9. To add a new sample analyst is required to provide description of sample and then click on “*Add Sample*” hyperlink. FIMS application automatically adds the time stamp to the item created. Initially, sample test status is set to “*Test Pending*” for the sample. Sample information can be updated by clicking on “*Edit*” hyperlink and existing sample can be deleted from the system by clicking on “*Delete*” hyperlink.

This section also enables analysts to view the final sample, sample photo, item, and item photo report. To access the individual sample/sample photo report analyst can click on “*View Report*” or “*Photo Sheet*” hyperlink. To view comprehensive item report analysts can click on “*Item Report*” or “*Item Photo Report*” at the bottom of the page.

To complete the process for item testing, the analyst is required to click on “*Item Test Complete*” button, as shown in Figure 9.9. Once clicked, analyst will not be able to make any alterations to the existing item test report.

WEST VIRGINIA STATE POLICE
FORENSIC LABORATORY TOXICOLOGY

Open Existing Case
 Item Details
 Chain Of Custody
 Send Items
 Receive Items
 Change Password

Create/View Sample for Item

LabCase#: 2006000007
 Item ID : 2006000007-P-2-I-1
 Item Name: Screw Driver
 Item Description: Screw Driver (Suspect's Car)
 Exam Requested: Blood Identification

Upload Item Photo

View/Upload Item Photos

List of Samples (Test Pending / In process)

Edit	Sample ID	Sample Description	Date Created	Test Status
Delete Edit	2006000007-P-2-I-1-S-2	Sample 2	7/12/2006 8:03:46 PM	Test Pending Choose Add Test Photo
Delete Edit	2006000007-P-2-I-1-S-3	Sample 3	7/12/2006 8:03:58 PM	Test Pending Choose Add Test Photo

Add Sample

List of Samples (Test Done)

Sample ID	Sample Description	Date Created	Test Status
2006000007-P-2-I-1-S-1	Sample 1	7/12/2006 8:03:41 PM	Test Done View Result Photo Sheet

List of Item Report(s)

View Item Report

Figure 9.9: Item Detail Section

Analysts can access this section by clicking on the “*View/Upload Sample Photo*” hyperlink in the item details section as shown in Figure 9.9. View picture section list the pictures already attached to the item with their thumbnails as shown in Figure 9.10. Analysts can also view the full size image by clicking on the image thumbnail. Full size image opens in a new window, which can be closed after use.

Figure 9.10: View Picture Section

Analysts can upload any digital photo in JPG format directly into the database using this section as shown in Figure 9.11. To upload an image analysts are required to browse for the image path, set other required fields and click on the “*Upload the file*” hyperlink to upload the image into database. On successful upload a thumbnail appears on the bottom of the page with a success message.

The screenshot shows a web browser window titled "SamplePhoto - Microsoft Internet Explorer". The address bar displays "http://localhost/Toxicology/Forms/SamplePhoto.aspx?SID=2006000007-P-2-I-1-S-1". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Clinton, Mary L" and "Date: 7/12/2006". Below the header, there are two buttons: "View Pictures" and "Upload Pictures". The main content area is titled "Photo Notes Sheet" and contains the following fields:

- LabCase#: 2006000007
- Item ID: 2006000007-P-2-I-1
- Sample ID: 2006000007-P-2-I-1-S-1
- Select File: C:\Documents and Settings [Browse...]
- File Name: [Text Input Field]
- Notes: [Text Input Field]

At the bottom of the form is a button labeled "Upload the files >". On the left side of the page, there is a sidebar for the "WEST VIRGINIA STATE POLICE FORENSIC LABORATORY TOXICOLOGY" with a list of links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password". The footer of the page includes the copyright notice "© 2006 Rachna S. Ahluwalia - West Virginia University" and the text "Local intranet".

Figure 9.11: Upload Sample Picture Section

Choosing Test Worksheet

After sample creation, analysts are required to decide what kinds of tests are required? Analysts are required to make decision of choosing type of test manually. One decision is made the analyst can see the list of tests available, and then click “*Choose Test*” hyperlink as shown in Figure 9.12. FIMS application remembers the chosen sample ID during the process.

The worksheet for the toxicology unit is:

- Drug Analysis

Figure 9.12: Choose Sample Test Section

Drug Analysis Worksheet

Drug Analysis Worksheet is used for filling information pertaining Drug analysis test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 9.13. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "DrugAnalysisSheet - Microsoft Internet Explorer". The address bar displays "http://localhost/Toxicology/Forms/DrugAnalysisSheet.aspx?SID=2006000007-P-2-I-1-S-1". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Clinton, Marry L" and "Date: 7/12/2006". A "Home | Log Out" link is also present.

The main content area is divided into two columns. The left column contains the "WEST VIRGINIA STATE POLICE" logo and the "FORENSIC LABORATORY TOXICOLOGY" text. Below this, there are links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password". The right column contains a "Save Results" button at the top. Below it is a section titled "Drug analysis Worksheet" with the following fields: "Lab Case ID: 2006000007", "Analyst ID:", "Item ID:", "Witness:", "Sample ID: 2006000007-P-2-I-1-S-1", and "Created:". Below this is a section titled "Drug Analysis Results" with the following fields: "Sample: Urine", "Barbiturates: Negative", "Benzodiazepines: Negative", "Cocaine Metabolite: Negative", "THC Metabolite: Negative", "Opiate: Negative", "Amphetamine: Negative", "Propoxyphene: Negative", "Phencyclidine (PCP): Negative", and "Tricyclic Antidepressants (TCA): Negative". Below this is a section titled "Extraction Method" with a table header: "Method", "Date", "Sample Amount", and "Results".

The bottom of the page shows a "Done" button and a "Local intranet" icon.

Figure 9.13: Drug Analysis Worksheet

Receive Item

Once an item is sent by CEP unit, Toxicology unit analyst is responsible for receiving it by clicking on “*Receive*” button, under receive item section, as shown in Figure 9.14. This completes the handshaking process of item transfer between units.

Figure 9.14: Receive Item Section

Send Item

After completion of item testing, analyst is required to return the evidence item back to CEP unit. Figure 9.15 shows the section used to send an item back to the CEP unit. Analyst can use the drop down to select item ID and click on “Send” hyperlink, to send item back to CEP.

The screenshot displays the 'Send Items' section of the Forensic Information Management System (FIMS). The page is accessed via a Microsoft Internet Explorer browser window. The address bar shows the URL: <http://localhost/Toxicology/Forms/SendItems.aspx>. The page header includes the FIMS logo and the text 'FORENSIC INFORMATION MANAGEMENT SYSTEM'. The user information is displayed as 'User: Clinton, Marry L' and 'Date: 7/12/2006'. The page is divided into two main sections. The left section, titled 'WEST VIRGINIA STATE POLICE FORENSIC LABORATORY TOXICOLOGY', contains a list of links: 'Open Existing Case', 'Item Details', 'Chain Of Custody', 'Send Items', 'Receive Items', and 'Change Password'. The right section, titled 'Send Item(s)', shows the 'Item Selected: 2006000007-P-2-I-1'. Below this, there is a table with the following data:

	Item ID	Sent By	To Unit	Sent Request Date
Delete	2006000007-P-2-I-1	tox1	11	7/12/2006 8:02:25 PM
Send	2006000007-P-2-I-1			

The 'Send' button is highlighted in blue. The footer of the page includes the copyright notice: '©2006 Rashpal S. Ahluwalia, West Virginia University' and the text 'Local intranet'.

Figure 9.15: Send Item Section

Chain of Custody

Item chain of custody information is shown in Figure 9.16. FIMS application records used ID, unit name, and time stamp for tracking item chain of custody.

Item ID	Sent Unit	Sent By	Date Sent	To Unit	Received By	Date Received	Status
2006000007-P-2-I-1	Central Evidence Processing	pss	7/11/2006 9:10:36 PM	Toxicology	tox1	7/12/2006 8:02:21 PM	Received
2006000007-P-2-I-1	Toxicology	tox1	7/12/2006 8:02:25 PM	Central Evidence	Receiving		Not Received

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Figure 9.16: Item Chain Of Custody

Change User Password

Analyst can change password through this section by providing appropriate credentials as shown in Figure 9.17.

The screenshot shows a web browser window titled "Change Password - Microsoft Internet Explorer". The address bar displays "http://localhost/Toxicology/Forms/Changepass.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Clinton, Marry L" and "Date: 7/12/2006". There are links for "Home" and "Log Out". The main content area is divided into two columns. The left column contains the "WEST VIRGINIA STATE POLICE" logo and the text "FORENSIC LABORATORY TOXICOLOGY". Below this, there are links for "Open Existing Case" and "Change Password". The right column is titled "Change Password" and contains a form with the following fields: "Username" (pre-filled with "tox1"), "Old Password", "New Password", and "Re-enter new Password". A "Submit" button is located below the "Re-enter new Password" field. The footer of the page displays "©2006 Rashpal S. Ahluwalia, West Virginia University".

Figure 9.17: Change Password Section

Exiting Toxicology

Users can terminate the current session by clicking on “*Log Out*” hyperlink on the top right corner of the page.

9.2.4 Generating Item and Sample Reports

The analyst can generate the following types of reports

- Item Report
- Item Photo Report
- Sample Report
- Sample Photo Report

Figure 9.18 shows the item report, which is a cumulative report for all the samples. This section also facilitate analyst to export report via PDF/MS-Word format, as shown in Figure 9.20 and Figure 9.21.

Report_ItemReport - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://localhost/Toxicology/Forms/Report_ItemReport.aspx Go Links

FIMS FORENSIC INFORMATION MANAGEMENT SYSTEM User: Clinton, Marry L Date: 7/12/2006 Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY TOXICOLOGY

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Export Via PDF **Export Via MSWORD** **Print Report**

Item Report

1 of 1 100% powered by crystal

Forensic Laboratory **Toxicology Unit**

Item Report

Lab Case ID: 2006000007 **Item Description:** Screw Driver (Suspect's Car)

Package ID: 2006000007-P-2

Item ID: 2006000007-P-2-I-1

Sample ID: 2006000007-P-2-I-1-S-1

Sample Description: Sample 1

Test Result:

Figure 9.18: Item report

Reports - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address http://localhost/Toxicology/Forms/Report_Drug.aspx?SID=2006000007-P-2-I-1-S-1 Go Links

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY
TOXICOLOGY

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Export Via PDF Export Via MSWORD Print Report

Sample Report

1 of 1 100% powered by crystal

Forensic Laboratory

Drug Analysis Report

Toxicology Unit

Lab Case ID:	2006000007	Analyst:	tox1
Item ID:	2006000007-P-2-I-1	Witness:	
Sample ID:	2006000007-P-2-I-1-S-1	Date Created:	7/12/2006 8:05:31PM

Drug Analysis Results

Sample: Urine

Barbiturates:	Negative	Benzodiazepines:	Negative
Cocaine Metabolite:	Negative	THC Metabolite:	Negative
Opiate:	Negative	Amphetamine:	Negative
Propoxyphene:	Negative	Phencyclidine (PCP):	Negative
Tricyclic Antidepressants (TCA):	Negative		

Extraction Method

Done Local intranet

Figure 9.19: Sample Report

Figure 9.20: Sample Report in PDF Format

http://localhost/Toxicology/Forms/Report_Drug.aspx?SID=2006000007-P-2-I-1-S-1 - Microsoft Internet Explorer

File Edit View Insert Format Tools Table Go To Favorites Help

Back Forward Stop Search Favorites Go Links

Address http://localhost/Toxicology/Forms/Report_Drug.aspx?SID=2006000007-P-2-I-1-S-1

Final Showing Markup Show

Forensic Laboratory
 Drug Analysis Report

Toxicology Unit

Lab Case ID: 2006000007	Analyst: tox1
Item ID: 2006000007-P-2-I-1	Witness:
Sample ID: 2006000007-P-2-I-1-S-1	Date Created: 7/12/2006 8:05:31PM

Drug Analysis Results

Sample: Urine

Barbiturates: Negative Cocaine Metabolite: Negative Opiate: Negative Propoxyphene: Negative Tricyclic Antidepressants (TCA): Negative	Benzodiazepines: Negative THC Metabolite: Negative Amphetamine: Negative Phencyclidine (P CP): Negative
--	--

Extraction Method

Method	Date	Sample Amount	Results

Figure 9.21: Sample Report in MS Word Format

CHAPTER 10

FIRE ARMS/TOOL MARKS

10.1 Existing Fire Arms/Tool Marks Process

The Firearms/Tool Marks Unit analyzes firearms, fired cartridge cases, and fired bullets. By test firing the weapon and recovering the known fired bullets and cartridge cases, a comparison can be made with the evidence from the crime scene. The Firearms unit has a computerized digital imaging system that allows firearm evidence to be compared on screen, stored and printed. This unit manages the National Integrated Ballistics Information Network (NIBIN). NIBIN allows nationwide comparisons of fired cartridge cases. New technology allows for a computerized search of data to possibly link serial shooting cases that may have never been linked before. The analyst in the firearms unit receives the LEIF form and chain of custody form along with the evidence items. Samples are prepared and evidence is analyzed. After the tests are performed, appropriate forms are completed. The forms/worksheets used by this unit are: Worksheet A (WA), Worksheet B (WB), Fired Bullet (F), Fired Cartridge (FC), Tool/Tool Mark (TT), Chemical Residue (CE), and Distance Determination (DD). Once the examinations are performed, evidence is returned to the CER and the secretary prepares a draft report. The draft report is reviewed by the analyst/reviewer. After approval, the final report is sent to CER. Figure 10.1 shows the existing process for the firearms unit

Figure 10.1: Existing Fire Arms Process

10.2 Re-engineering the Fire Arms/Tool Marks Process

The analyst in the fire arms unit receives the items assigned for further processing and analysis from CEP. Received items are sub-divided into samples for conducting the requested tests. An individual item may be divided into many samples according to the requirement and complexity of the required test. A report for each sample is generated. An item report is compiled by combining sample reports. After the report is received, the reports along with the test items are sent back to CEP for further processing. The evidence and information flow diagram is shown in Figure 10.2.

Figure 10.2: Step 5 Receive Assigned Items from CEP

Detail procedure followed by fire arms/tool marks unit for further processing and analysis is shown in Figure 10.3.

Figure 10.3: Detail Item Processing Procedure

10.2.1 Fire Arms/Tool Marks Entity Relationship Diagram

Fire Arms/Tool Marks data tables are connected with each other through relations as shown in the figure 10.4.

Figure 10.4: Entity Relationship diagram

10.2.2 Fire Arms Database Tables

The Fire Arms unit module stores its data in the following tables

- Bullet Characteristics Worksheet
- Fire Cartridge Case Worksheet
- Chemical Residue Worksheet
- Comparison Examination Worksheet
- Distance Determination Worksheet
- Examination Worksheet - A
- Examination Worksheet - B
- Examination Short Form Worksheet
- Tool Mark Worksheet
- Visual Micro Residue Examination Worksheet

The various fields of the bullet characteristics worksheet table are shown in Table 10-1. Bullet characteristics worksheet data is stored and maintained in this data table

Table 10-1: Bullet Characteristics Worksheet Table

tbl_FireArms_BulletChar	
LabCaseID	
ItemID	
SampleID	
IDLocation	
Analyst	
Witness	
BulletWeight	
BulletDia	
BulletCaliber	
BulletManufacturer	
BulletComposition	
BulletType	
BulletMagnetic	
BulletTwist	
LGNumber	
BallisticCondition	
ForeignMaterial	
LWidth1	
LWidth2	
LWidth3	
LWidth4	
LWidth5	
LWidth6	
LWidth7	
LWidth8	
LWidthAvg	
RWidth1	
RWidth2	
RWidth3	
RWidth4	
RWidth5	
RWidth6	
RWidth7	
RWidth8	
RWidthAvg	
IBISEntry	
EntryDate	
ResonNoEntry	

The various fields of the fire cartridge case worksheet table are shown in Table 10-2. Fire cartridge case worksheet data is stored and maintained in this data table

Table 10-2: Fire Cartridge Case Worksheet Table

tbl_FireArms_CartridgeCaseSheet	
	LabCaseID
	ItemID
	SampleID
	IDLocation
	Analyst
	Witness
	CartManufacturer
	CartHeadStamp
	CartDesignation
	CartFinish
	CartType
	CartDamage
	CartPrimerType
	CartPrimerFinish
	CartPrimerLacquer
	CartModifications
	CartForeignMat
	CartBreechface
	CartExtractor
	CartEjector
	CartChamber
	CartFPinImpression
	IBISEntry
	EntryDate
	ResonNoEntry
	IBISCorrelation
	DateCreated
	Comments
	Results

- The various fields of the chemical residue worksheet table are shown in Table 10-
3. Chemical residue worksheet data is stored and maintained in this data table

Table 10-3: Chemical Residue Worksheet Table

tbl_FireArms_ChemResidue	
	LabCaseID
	ItemID
	SampleID
	IDLocation
	Analyst
	Witness
	SpecDesc
	ChemTest
	Reagent
	MGTest
	DTest
	SRTest
	MGResult
	DResult
	SRResult
	DateCreated
	Comments
	Results

The various fields of the examination worksheet - A table are shown in Table 10-4. Examination worksheet - A data is stored and maintained in this data table

Table 10-4: Examination Worksheet –A Table

tbl_FireArms_ExamSheetA
LabCaseID
ItemID
SampleID
IDLocation
Analyst
Witness
SafetyPos
HammerPos
SafetyOpn
GunManufacturer
GunSerialNo
GunImporter
GunType
GunFinish
GunMagCapacity
GunMechanism
GunBrLength
GunModel
GunOverLength
GunCaliber
GunWt
GunGripType
ForeignMat
TriggerPull
ActionType1
ActionType2
ActWtNum
ActWtDeno
ActWt1
ActWt2
ActWt3
BoreCondition
PowderParticles
SafetyRecall
AmmuType
TestFires1
TestFires2
AmmuBrand1

The various fields of the examination worksheet table are shown in Table 10-

5. Examination worksheet data is stored and maintained in this data table

Table 10-5: •Distance Determination Worksheet Table

tbl_FireArms_ExamSheetShort
LabCaseID
ItemID
SampleID
IDLocation
Analyst
Witness
GunManufacturer
GunSerialNo
GunModel
GunCaliber
BoreCondition
PowderParticles
SafetyRecall
AmmuType
TestFires1
TestFires2
AmmuBrand1
AmmuBrand2
AmmuWt1
AmmuWt2
IBISEntry
EntryDate
ResonNoEntry
IBISCorrelation
DateCreated
Comments
Results

The various fields of the tool mark worksheet table are shown in Table 10-6.
Tool mark worksheet data is stored and maintained in this data table

Table 10-6: Tool Mark Worksheet Table

tbl_FireArms_ToolMark
LabCaseID
ItemID
SampleID
IDLocation
Analyst
Witness
BulletManufacturer
BulletModel
BulletColor
BulletWidth
BulletLength
BulletMat
BulletForeignMat
BulletDesc
DateCreated
Comments
Results

The various fields of the visual micro residue examination worksheet table are shown in Table 10-7. Visual micro residue examination worksheet data is stored and maintained in this data table

Table 10-7: Visual Micro Residue Examination Worksheet Table

tbl_FireArms_VMRExam
LabCaseID
ItemID
SampleID
IDLocation
Analyst
Witness
SpecDischarge
SpecColor
SpecWidth
SpecLength
SpecMat
SpecForeignMat
SpecDesc
HSmoke
HWipe
HSingBurn
HRipTear
HPowder
HLocation
DateCreated
Comments
Results

10.2.3 Working with Fire Arms

Fire Arms home page requires username and password to verify user credentials, as shown in the Figure 10.5. After verifying credentials, a user is directed to list of items assigned to him/her for further processing.

Figure 10.5: Fire Arms Home Page

View Items Assigned

Figure 10.6 shows the list of items assigned to the analyst by the laboratory administration unit for further analysis. Initially, job status for the item assigned is set to “*Job Pending*”. The “*View Details*” hyperlink enables an analyst to view the details of the case. If the list of items assigned grows long i.e. more than 15 items, the record set is divided into multiple pages. Analysts can navigate between different pages by clicking on the header and footer navigation bar of the list.

The screenshot displays the 'Assigned Items List' within the Forensic Information Management System (FIMS). The interface is viewed through a Microsoft Internet Explorer browser window. The address bar shows the URL: `http://localhost/Firearms/Forms/AssignedItemsList.aspx`. The user is logged in as 'User: William, James R.' with a date of 'Date: 7/12/2006'. The system is identified as 'FORENSIC INFORMATION MANAGEMENT SYSTEM' (FIMS) for the 'WEST VIRGINIA STATE POLICE'. The left sidebar contains the 'FORENSIC LABORATORY FIREARM / TOOL MARK' logo and links for 'Open Existing Case' and 'Change Password'. The main content area features a table titled 'List of Item(s)Assigned' with a pagination indicator '1' at the top right. The table has four columns: 'LabCase #', 'Item ID', 'Date Assigned', and 'Test Status'. It lists three items, all with a 'Job Pending' status. Each item has a corresponding 'Item Detail' hyperlink. The footer of the page includes the copyright notice '©2006 Rashpal S. Ahluwalia, West Virginia University' and a 'Local intranet' icon.

LabCase #	Item ID	Date Assigned	Test Status
2006000004	2006000004-P-1-1-5	6/9/2006	Job Pending
2006000005	2006000005-P-1-1-3	7/5/2006	Job Pending
2006000007	2006000007-P-1-1-3	7/11/2006	Job Pending

Figure 10.6: Assigned Item List

Item Picture Management

This section describes the procedure of attaching pictures with an item. Analysts can perform two kinds of operation:

- View Pictures
- Upload Pictures

Analysts can access this section by clicking on the “*View/Upload Item Photo*” hyperlink in the item details section as shown in Figure 10.9. View picture section list the pictures already attached to the item with their thumbnails as shown in Figure 10.7. Analysts can also view the full size image by clicking on the image thumbnail. Full size image opens in a new window, which can be closed after use.

Figure 10.7: View Item Photo

The analysts can upload any digital photo in JPG format directly into the database using this section as shown in Figure 10.8. To upload an image into database, analysts are required to browse for the image path, set other required fields and click on the “*Upload the file*” hyperlink. On successful upload a thumbnail appears on the bottom of the page with a success message.

Figure 10.8: Upload Item Picture Section

Working with Samples

Analysts receive items from the CEP unit for further analysis and processing. Once received items are sub-divided into samples for conducting requested tests. Each item can be divided into one or more samples according to the requirement and complexity of the required test.

Analysts can create new, update or delete existing samples from the item details section as shown in Figure 10.9. To add a new sample analyst is required to provide description of sample and then click on “*Add Sample*” hyperlink. FIMS application automatically adds the time stamp to the item created. Initially, sample test status is set to “*Test Pending*” for the sample. Sample information can be updated by clicking on “*Edit*” hyperlink and existing sample can be deleted from the system by clicking on “*Delete*” hyperlink.

This section also enables analysts to view the final sample, sample photo, item, and item photo report. To access the individual sample/sample photo report analyst can click on “*View Report*” or “*Photo Sheet*” hyperlink. To view comprehensive item report analysts can click on “*Item Report*” or “*Item Photo Report*” at the bottom of the page.

To complete the process for item testing, the analyst is required to click on “*Item Test Complete*” button, as shown in Figure 10.9. Once clicked, analyst will not be able to make any alterations to the existing item test report.

WEST VIRGINIA STATE POLICE
FORENSIC LABORATORY
FIREARM / TOOL MARK

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Create/View Sample for Item

LabCase#: 2006000007
Item ID: 2006000007-P-1-I-3
Item Name: Knife
Item Description: Knife (suspect's knife)
Exam Requested: Tool Mark Identification

Upload Item Photo

View/Upload Item Photos

List of Samples (Test Pending / In process)

Edit	Sample ID	Sample Description	Date Created	Test Status
Delete Edit	2006000007-P-1-I-3-S-2	sample 2	7/12/2006 8:11:22 PM	Test Pending Choose Test Add Photo
Delete Edit	2006000007-P-1-I-3-S-3	sample 3	7/12/2006 8:11:28 PM	Test Pending Choose Test Add Photo

[Add Sample](#)

List of Samples (Test Done)

Sample ID	Sample Description	Date Created	Test Status
2006000007-P-1-I-3-S-1	sample 1	7/12/2006 8:11:16 PM	Test Done View Result Photo Sheet

List of Item Report(s)

[View Item Report](#)

Figure 10.9: Item Detail Section

Analysts can access this section by clicking on the “*View/Upload Sample Photo*” hyperlink in the item details section as shown in Figure 10.9. View picture section list the pictures already attached to the item with their thumbnails as shown in Figure 10.10. Analysts can also view the full size image by clicking on the image thumbnail. Full size image opens in a new window, which can be closed after use.

Figure 10.10: View Picture Section

Analysts can upload any digital photo in JPG format directly into the database using this section as shown in Figure 10.11. To upload an image analysts are required to browse for the image path, set other required fields and click on the “*Upload the file*” hyperlink to upload the image into database. On successful upload a thumbnail appears on the bottom of the page with a success message.

SamplePhoto - Microsoft Internet Explorer

Address: http://localhost/Firearms/Forms/SamplePhoto.aspx?SID=2006000007-P-1-I-3-S-2

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: William, James R
Date: 7/12/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY
FIREARM / TOOL MARK

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

View Pictures Upload Pictures

Photo Notes Sheet

LabCase#: 2006000007
Item ID: 2006000007-P-1-I-3
Sample ID: 2006000007-P-1-I-3-S-2
Select File : Browse...
File Name:
Notes:
Upload the files >

Image file uploaded

©2006 Rashpal S. Ahluwalia, West Virginia University

Local intranet

Figure 10.11: Upload Sample Picture Section

Choosing Test worksheet

After sample creation, analysts are required to decide what kinds of tests are required? Analysts are required to make decision of choosing type of test manually. Once decision is made the analyst can see the list of tests available, and then click “*Choose Test*” hyperlink as shown in Figure 10.12. FIMS application remembers the chosen sample ID during the process.

The worksheet for the fire arms/tool marks are:

- Bullet Characteristics
- Fire Cartridge Case
- Chemical Residue
- Comparison Examination
- Distance Determination
- Examination sheet - A
- Examination sheet - B
- Examination Short Form
- Tool Mark Analysis
- Visual Micro Residue

Figure 10.12: Choose Sample Test Section

Bullet Characteristics Worksheet

Bullet characteristics worksheet is used for filling information pertaining to bullet characteristics test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 10.13. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

BulletCharacteristicsSheet - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address <http://localhost/Firearms/Forms/BulletCharacteristicsSheet.aspx?SID=2006000007-P-1-1-3-S-1> Go Links >>

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: William, James R.
Date: 7/12/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY
FIREARM / TOOL MARK

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Save Results

Fired Bullet / General Rifling Characteristics Worksheet

Lab Case ID: 2006000007 Analyst ID:

Item ID: Witness:

Sample ID: 2006000007-P-1-1-3-S-1 Date Created:

FiredBulletExamination

Probable Manufacturer:

Weight (Grains): Measured Diameter (Inches):

Composition: Probable Chambring / Caliber:

Bullet Type: Magnetic: Yes Direction Of Twist: Right

Number Of LandsAnd Grooves:

Terminal Ballistic Condition:

Foreign Material Present / Describe:

General Rifling Characteristics:

Done Local intranet

Figure 10.13: Bullet Characteristics Worksheet

Fire Cartridge Case Worksheet

Fire cartridge case worksheet is used for filling information pertaining to fire cartridge case test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 10.14. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "CartridgeCaseSheet - Microsoft Internet Explorer". The address bar displays "http://localhost/Firearms/Forms/CartridgeCaseSheet.aspx?SID=2006000007-P-1-1-3-S-1". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: William, James R." and "Date: 7/12/2006". A "Home | Log Out" link is also present. The main content area is titled "WEST VIRGINIA STATE POLICE FORENSIC LABORATORY FIREARM / TOOL MARK". It features a "Save Results" button and a "Firearms / Toolmark Identification Section" form. The form contains the following fields: "Lab Case ID: 2006000007", "Analyst ID:", "Item ID:", "Witness:", "Sample ID: 2006000007-P-1-1-3-S-1", "Date Created:", "Fired Cartridge Case Examination", "Probable Manufacturer:", "Head Stamp:", "Cartridge Designation:", "Cartridge Finish:", "Cartridge Type:", "Damage:", "Primer Type:", "Primer Finish:", "Primer Lacquer:", "Modifications Indicative Of Handloading:", "Foreign Material Present / Describe:", and "Markings / Characteristics Present". A sidebar on the left lists navigation options: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password". The status bar at the bottom shows "Done" and "Local intranet".

Figure 10.14: Fire Cartridge Case Worksheet

Chemical Residue Examination Worksheet

Chemical residue examination worksheet is used for filling information pertaining chemical residue examination test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 10.15. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "ChemicalResidue - Microsoft Internet Explorer". The address bar displays the URL: `http://localhost/Firearms/Forms/ChemicalResidue.aspx?SID=2006000007-P-1-I-3-S-1`. The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information: "User: William, James R" and "Date: 7/12/2006". A "Home | Log Out" link is also present.

The main content area is titled "Chemical Residue Examination Worksheet" and contains the following fields and buttons:

- Save Results** button
- Labcasenumber:** 2006000007
- Analyst ID:** (empty field)
- Item ID:** (empty field)
- Witness:** (empty field)
- SampleID:** 2006000007-P-1-I-3-S-1
- Date Created:** (empty field)
- Specimen Description:** (empty text area)
- Chemical Test Performed** section:
 - Reagents Tested Prior To Examination For Indicated Chemical Test:** Yes (dropdown menu)
 - Reagent Working Correctly (?):** Yes (dropdown menu)
 - Modified Griess Test:** Results: None (dropdown menu)
 - Dithiooxamide Test:** Results: None (dropdown menu)
 - Sodium Rhodizonate Test:** Results: None (dropdown menu)
- General Comments:** (empty text area)

The left sidebar contains the "WEST VIRGINIA STATE POLICE" logo and the "FORENSIC LABORATORY FIREARM / TOOL MARK" text. Below this, there are links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password".

Figure 10.15: Chemical Residue Examination Worksheet

Comparison/Examination Worksheet

Comparison/Examination worksheet is used for filling information pertaining to comparison/examination test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 10.16. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "ComparisonExaminationSheet - Microsoft Internet Explorer". The address bar displays the URL: `http://localhost/Firearms/Forms/ComparisonExaminationSheet.aspx?SID=2006000007-P-1-1-3-S-1`. The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information: "User: William, James R" and "Date: 7/12/2006". A "Home | Log Out" link is also present.

The main content area is divided into two columns. The left column contains the "WEST VIRGINIA STATE POLICE" logo and the "FORENSIC LABORATORY FIREARM / TOOL MARK" section. Below this, there are links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password".

The right column features a "Save Results" button at the top. Below it is a blue header for the "Comparison / Examination Worksheet". The form fields include:

- Lab Case ID: 2006000007
- Analyst ID: [empty field]
- Item ID: [empty field]
- Witness: [empty field]
- Sample ID: 2006000007-P-1-1-3-S-1
- Date Created: [empty field]

Below these fields is the "Examination Comparison" section, which includes a table with headers: "Comparison", "Of Class", "Characteristics", "Individual", "Characteristics", and "Conclusion". The table has two rows of input fields.

Below the table is a "General Comments:" section with a text area and a "Test Result:" section with a text area.

Figure 10.16: Comparison/Examination Worksheet

Distance Determination Worksheet

Distance Determination Worksheet is used for filling information pertaining to distance determination test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 10.17. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "DistanceDetermination - Microsoft Internet Explorer". The address bar displays the URL: `http://localhost/Firearms/Forms/DistanceDetermination.aspx?SID=2006000007-P-1-I-3-S-2`. The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information: "User: William, James R" and "Date: 7/12/2006". A "Home | Log Out" link is also present.

The main content area is titled "Distance Determination Worksheet" and contains the following fields and sections:

- Save Results** button
- Lab Case ID:** 2006000007
- Analyst ID:** [Text Box]
- Item ID:** [Text Box]
- Witness:** [Text Box]
- Sample ID:** 2006000007-P-1-I-3-S-2
- Date Created:** [Text Box]
- Firearm Information**
 - Manufacturer:** [Text Box]
 - Serial Number:** [Text Box]
 - Firearm Model:** [Text Box]
 - Barrel Length (Inches):** [Text Box]
 - Firearm Caliber Designation:** [Text Box]
- Ammunition Information**
 - Head Stamped:** [Text Box]
 - Projectile Type:** [Text Box]
 - Powder Type:** [Text Box]
 - Projectile Weight (Grains):** [Text Box]
 - Cartridge Headstamp Designation:** [Text Box]
- Test fires**

ID	Distance Shot	Target Material	Number of Fires	Additional Notes

The left sidebar contains the "WEST VIRGINIA STATE POLICE" logo and the "FORENSIC LABORATORY FIREARM / TOOL MARK" section. It also includes a list of links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password".

Figure 10.17: Distance Determination Worksheet

Firearm Examination Worksheet - A

Firearm examination worksheet - A is used for filling information pertaining to firearm examination - A test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 10.18. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "ExaminationSheetA - Microsoft Internet Explorer". The address bar displays the URL: `http://localhost/Firearms/Forms/ExaminationSheetA.aspx?SID=2006000007-P-1-I-3-S-2`. The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information: "User: William, James R" and "Date: 7/12/2006". A "Home | Log Out" link is also present.

The main content area is titled "Firearm ExaminationWorksheet - A" and contains a "Save Results" button at the top. Below this, the form is organized into sections:

- Lab Case ID:** 2006000007
- Analyst ID:** (empty field)
- Item ID:** (empty field)
- Witness:** (empty field)
- Sample ID:** 2006000007-P-1-I-3-S-2
- Date Created:** (empty field)
- Manual Safety Type(s):** (empty field)
- Position Of Safety As Received:** Off - Fire Position (dropdown menu)
- Striker Hammer Position:** Bolt Back (dropdown menu)
- Safety Operating Condition:** (empty field)
- Firearm Specifications:**
 - Manufacturer:** (empty field)
 - Serial Number:** (empty field)
 - Importer:** (empty field)
 - Finish:** (empty field)
 - Type:** (empty field)
 - Cylinder / Magazine Capacity:** (empty field)
 - Type Of Mechanism:** (empty field)
 - Barrel Length (Inches):** (empty field)

The left sidebar contains the "WEST VIRGINIA STATE POLICE" logo and the "FORENSIC LABORATORY FIREARM / TOOL MARK" logo. Below these logos are links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password".

Figure 10.18 Firearm Examination Worksheet - A

Firearm Examination Worksheet – B

Firearm examination worksheet - B is used for filling information pertaining fire examination worksheet - B test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 10.19. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "ExaminationSheetB - Microsoft Internet Explorer". The address bar displays the URL: `http://localhost/Firearms/Forms/ExaminationSheetB.aspx?SID=2006000007-P-1-1-3-5-2`. The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information: "User: William, James R" and "Date: 7/12/2006". A "Home | Log Out" link is also present.

The main content area is divided into two columns. The left column contains the "WEST VIRGINIA STATE POLICE" logo and the "FORENSIC LABORATORY FIREARM / TOOL MARK" logo. Below these logos are links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password". The right column contains a "Save Results" button at the top. Below it is a blue header for "Firearm ExaminationWorksheet - B".

The form fields in the right column include:

- Lab Case ID: 2006000007
- Analyst ID: [text input]
- Item ID: [text input]
- Witness: [text input]
- Sample ID: 2006000007-P-1-1-3-5-2
- Date Created: [text input]

Below these fields is the "General Rifling Characteristics" section, which includes:

- Number Of LandsAnd Grooves: [text input]
- Direction Of Twist: [Right] (dropdown menu)
- Land Impression Widths (Inches): [seven text input boxes]
- Average Width (Inches): [text input]
- Groove Impression Widths (Inches): [seven text input boxes]
- Average Width (Inches): [text input]

At the bottom of the form is a "General Comments:" section with a large text area. Below the comments section is a blue header for "Test Result:" followed by a text area.

The browser's status bar at the bottom shows "Done" and "Local intranet".

Figure 10.19: Examination sheet – B

Examination Sheet (Short Form) Worksheet

Examination sheet (Short Form) worksheet is used for filling information pertaining to examination sheet (Short Form) worksheet test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 10.20. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "ExaminationSheetShortForm - Microsoft Internet Explorer". The address bar displays "http://localhost/Firearms/Forms/ExaminationSheetShortForm.aspx?SID=2006000007-P-1-I-3-S-2". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: William, James R. Date: 7/12/2006". A "Save Results" button is located at the top of the main content area. The main content area is titled "Examination Sheet (Short Form) Worksheet" and contains the following fields:

- Lab Case ID: 2006000007
- Analyst ID: [Text Box]
- Item ID: [Text Box]
- Witness: [Text Box]
- Sample ID: 2006000007-P-1-I-3-S-2
- Date Created: [Text Box]
- Firearm Specifications
 - Manufacturer: [Text Box] Serial Number: [Text Box]
 - Firearm Model: [Text Box] Firearm Caliber Designation: [Text Box]
 - Operating Condition / Test Firing
 - Condition of Bore: [Text Box] Powder Particles Present: [Yes] Safety Recall: [Yes]
 - Ammunition Bullet Type: [Text Box] If 'Yes', attach.
 - Number Of Test Fires: [Text Box]
 - Brand Of Ammunition Used: [Text Box]
 - Ammunition Bullet Weight: [Text Box] Grains [Text Box] Grains

The left sidebar contains the "WEST VIRGINIA STATE POLICE" logo and the "FORENSIC LABORATORY FIREARM / TOOL MARK" logo. Below the logos, there is a list of links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password". The bottom of the browser window shows the "Done" button and the "Local intranet" status.

Figure 10.20: Examination sheet (Short Form) Worksheet

Tool Mark Worksheet

Tool Mark Worksheet is used for filling information pertaining Tool Mark Worksheet test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 10.21. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst can not make any alterations in the worksheet once the “*Test Done*” button is clicked.

ToolMark - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address <http://localhost/Firearms/Forms/ToolMark.aspx?SID=2006000007-P-1-1-3-S-2> Go Links

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: William, James R
Date: 7/12/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

**FORENSIC LABORATORY
FIREARM / TOOL MARK**

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Save Results

Toolmark Worksheet

Lab Case ID: 2006000007 Witness:

Analyst ID: Sample ID: 2006000007-P-1-1-3-S-2

Item ID: Date Created:

Manufacturer: Model:

Color: Overall Width (Inches):

Overall Length (Inches):

Material:

Foreign Material Present / Describe:

Description:

General Comments:

Done Local intranet

Figure 10.21: Tool Mark Worksheet

Visual/Microscopic Residue Examination Worksheet

Visual/Microscopic residue examination worksheet is used for filling information pertaining visual/microscopic residue examination worksheet test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 10.22. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "VisualMicroResidueExam - Microsoft Internet Explorer". The address bar shows the URL: `http://localhost/Firearms/Forms/VisualMicroResidueExam.aspx?SID=2006000007-P-1-1-3-5-2`. The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information: "User: William, James R" and "Date: 7/12/2006". There are links for "Home" and "Log Out".

The main content area is titled "Visual / Microscopic Residue Examination Worksheet". It contains a "Save Results" button at the top. Below this, there are fields for "Lab Case ID: 2006000007", "Analyst ID:", "Item ID:", "Witness:", "Sample ID: 2006000007-P-1-1-3-5-2", and "Date Created:". The "Visual Examination" section includes a "Specimen Description:" field, "Color:", "Overall Width (Inches):", "Overall Length (Inches):", "Material:", and "Foreign Material Present / Describe:". The "Microscopic Examination" section includes "Residues Present Indicative of a Firearm Discharge:" (Yes/No), "Smoke:" (Yes/No), "Bullet Wipe:" (Yes/No), "Singing / Burning:" (Yes/No), "Ripping / Tearing:" (Yes/No), and "Gunpowder Present (P):" (Yes/No).

The left sidebar contains the "WEST VIRGINIA STATE POLICE" logo and the "FORENSIC LABORATORY FIREARM / TOOL MARK" logo. It also has a list of links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password".

Figure 10.22: Visual/Microscopic Residue Examination Worksheet

Receive Item

Once an item is sent by CEP unit, firearms unit analyst is responsible for receiving it by clicking on “*Receive*” button, under receive item section, as shown in Figure 10.23. This completes the handshaking process of item transfer between units.

Figure 10.23: Receive Item Section

Send Item

After completion of item testing, analyst is required to return the evidence item back to CEP unit. Figure 10.24 shows the section used to send an item back to the CEP unit. Analyst can use the drop down to select item ID and click on “Send” hyperlink, to send item back to CEP.

The screenshot shows a web browser window titled "Senditems - Microsoft Internet Explorer" with the address bar displaying "http://localhost/Firearms/Forms/SendItems.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: William, James R." and "Date: 7/12/2006". A navigation menu on the left lists: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password". The main content area is titled "Send Item(s)" and shows "Item Selected: 2006000007-P-1-I-3". Below this is a table with the following data:

	Item ID	Sent By	To Unit	Sent Request Date
Delete	2006000007-P-1-I-3	fre1	12	7/12/2006 8:10:06 PM

Below the table, there is a "Send" button and a dropdown menu showing "2006000007-P-1-I-3". The footer of the page includes the copyright notice "©2006 Rashpal S. Ahluwalia, West Virginia University" and the text "Local intranet".

Figure 10.24: Send Item Section

Chain of Custody

Item chain of custody information is shown in Figure 10.25. FIMS application records used ID, unit name, and time stamp for tracking item chain of custody.

Chain Of Custody

Item Selected: 2006000007-P-1-I-3

Item ID	Sent Unit	Sent By	Date Sent	To Unit	Received By	Date Received	Status
2006000007-P-1-I-3	Central Evidence Processing	pss	7/11/2006 9:10:25 PM	Firearms/Toolmarks Identification	fre1	7/12/2006 8:10:00 PM	Received
2006000007-P-1-I-3	Firearms/Toolmarks Identification	fre1	7/12/2006 8:10:06 PM	Central Evidence Processing			Not Received

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Figure 10.25: Item Chain Of Custody

Change User Password

Analyst can change password through this section by providing appropriate credentials as shown in Figure 10.26

The screenshot shows a web browser window titled "Change Password - Microsoft Internet Explorer". The address bar displays "http://localhost/Firearms/Forms/Changepass.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: William, James R." and "Date: 7/12/2006". There are links for "Home" and "Log Out". The main content area is divided into two sections. The left section, titled "WEST VIRGINIA STATE POLICE", features the state police logo and the text "FORENSIC LABORATORY FIREARM / TOOL MARK". Below this, there are links for "Open Existing Case" and "Change Password". The right section, titled "Change Password", contains a form with the following fields: "Username:" (pre-filled with "fre1"), "Old Password:", "New Password:", and "Re-enter new Password:". A "Submit" button is located below the form. The footer of the page indicates "©2006 Rashpal S. Ahluwalia, West Virginia University".

Figure 10.26: Change Password Section

Exiting Fire Arms

Users can terminate the current session by clicking on “*Log Out*” hyperlink on the top right corner of the page.

10.2.4 Generating Item and Sample Reports

The analyst can generate the following types of reports

- Item Report
- Item Photo Report
- Sample Report
- Sample Photo Report

Figure 10.27 shows the item report, which is a cumulative report for all the samples. Figure 10.28 shows the sample report. This section also facilitate analyst to export report via PDF/MS-Word format, as shown in Figure 10.29 and Figure 10.30.

The screenshot shows a web browser window titled 'Reports - Microsoft Internet Explorer' with the address bar displaying 'http://localhost/Firearms/Forms/Report_ItemReport.aspx'. The page content is for the 'FORENSIC INFORMATION MANAGEMENT SYSTEM' (FIMS). On the left, there is a sidebar for 'WEST VIRGINIA STATE POLICE' with a logo and a list of links: 'Open Existing Case', 'Item Details', 'Chain Of Custody', 'Send Items', 'Receive Items', and 'Change Password'. Below this is the 'FORENSIC LABORATORY FIREARM / TOOL MARK' logo. The main content area has a header with 'User: William, James R.' and 'Date: 7/12/2006', and links for 'Home' and 'Log Out'. Below the header are three buttons: 'Export Via PDF', 'Export Via MSWORD', and 'Print Report'. The main title is 'ItemReport'. Below this is a navigation bar with '1 of 1' and a 'powered by crystal' logo. The report content is titled 'Forensic Laboratory' and 'Firearms / Toolmark Unit'. It includes a 'West Virginia State Police' logo and the title 'Item Report'. The report details are as follows:

Lab Case ID:	2006000007	Item Description:	Knife (suspect's Knife)
Package ID:	2006000007-P-1		
Item ID:	2006000007-P-1-I-3		
Sample ID:	2006000007-P-1-I-3-S-1		
Sample Description:	sample 1		
Test Result:			

Figure 10.27: Item report

Reports - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address http://localhost/Firearms/Forms/Report_CompExam.aspx?SID=2006000007-P-1-1-3-S-1 Go Links

FIMS FORENSIC INFORMATION MANAGEMENT SYSTEM

User: William, James R
Date: 7/12/2006
Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY
FIREARM / TOOL MARK

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Export Via PDF Export Via MSWORD Print Report

Sample Report

1 of 1 100% powered by crystal

Forensic Laboratory
Comparison / Examination Report

Firearms/Toolmark Unit

Lab Case ID: 2006000007 Analyst: ffe1
Item ID: 2006000007-P-1-1-3 Witness:
Sample ID: 2006000007-P-1-1-3-S-1 Date Created: 7/12/2006 8:15:38PM

Comparison / Examination

Comparison Of	Class Characteristics	Individual Characteristics	Conclusion
Parmjit / 4	5		

Done Local intranet

Figure 10.28: Sample Report

Figure 10.29: Sample Report in PDF Format

Figure 10.30: Item Report in MS Word Format

CHAPTER 11

LATENT PRINTS

11.1 Existing Latent Prints Process

A Latent Print Unit deals with hidden residue (perspiration, natural oils) left when the underside of the fingers and palms (or the underside of the bare toes and feet) come in contact with a surface. Because the impression is often invisible to the naked eye, it is called a latent or hidden print. If properly recovered, the latent print can lead the investigator to the perpetrator of the crime and later be used as evidence against that individual at a trial. The latent print evidence is put through a variety of physical and chemical processes designed to reveal the presence of latent impressions. The analyst in the latent prints unit receives the LEIF form and chain of custody form along with the evidence items. The analyst prepares samples and performs the required tests. After the tests are performed, appropriate forms are completed. The forms/worksheets used by this unit are: Analysis of Latent Prints (AL), Analysis of Exemplar Prints (AE), Comparison Evaluation & Verification (CEV) worksheet, AFIS/IAFIS Launch (AI) worksheet, ACE worksheet (ACE), and Technical Procedures (TP) worksheet. Once the examinations are completed, the evidence is returned to the CER and the secretary prepares a draft report. The draft report is reviewed by the analyst/reviewer. After approval the final report is sent are returned to CER. Figure 11.1 shows the existing process for the latent prints unit.

Figure 11.1: Existing Latent Prints Process

11.2 Re-engineering the Latent Prints Process

The analyst in the latent prints unit receives the items assigned for further processing and analysis from CEP. Received items are sub-divided into samples for conducting the requested tests. An individual item may be divided into many samples according to the requirement and complexity of the required test. A report for each sample is generated. An item report is compiled by combining sample reports. After the report is received, the reports along with the test items are sent back to CEP for further processing. The evidence and information flow diagram is shown in Figure 11.2.

Figure 11.2: Step 5 Receive Assigned Items from CEP

Detail procedure followed by latent prints unit for further processing and analysis is shown in Figure 11.3.

Figure 11.3: Detail Item Processing Procedure

11.2.1 Latent Prints Entity Relationship Diagram

Latent prints data tables are connected with each other through relations as shown in the Figure 11.4.

Figure 11.4: entity Relationship Diagram

11.2.2 Latent Prints Database Tables

The Latent Prints unit module stores its data in the following tables

- ACE Analysis & Comparison for Inked Finger Prints Worksheet
- AFIS & IAFIS Comparison Reference Worksheet
- Analysis of Latent Prints Worksheet
- Comparison, Evaluation, & Verification Worksheet
- Analysis Of Exemplar Prints Worksheet
- Technical Procedures Worksheet

The various fields of the ACE analysis & comparison for inked finger prints worksheet table are shown in Table 11-1. ACE analysis & comparison for inked finger prints worksheet data is stored and maintained in this data table

Table 11-1: ACE Analysis & Comparison for Inked Finger Prints Worksheet Table

tbl_LAT_ACEVInkFig_Worksheet
LabCaseID
	ItemID
	SampleID
	Analyst
	Witness
	ItemNo
	SubjNam
	Source
	Number
	Contri
	Dateofother
	Quality
	FigComp
	Photoscan
	DateCreated
	Comments
	TestResult

The various fields of the AFIS & IAFIS comparison reference worksheet table are shown in Table 11-2. AFIS & IAFIS comparison reference worksheet data is stored and maintained in this data table

Table 11-2: AFIS & IAFIS Comparison Reference Worksheet Table

tbl_LAT_AFIS_Worksheet
LabCaseID
	ItemID
	SampleID
	Analyst
	Witness
	LntDesign
	RFSEExt
	Sex
	Race
	Age
	Eyes
	Hair
	Height
	Weight
	POB
	databas
	Typesech
	PType
	FigPos
	Results
	Score
	SONcan
	CIBFBI
	Ulf
	DateCreated
	Comments
	TestResult

The various fields of the analysis of latent prints worksheet table are shown in Table 11-3. Analysis of latent prints worksheet data is stored and maintained in this data table

Table 11-3: Analysis of Latent Prints Worksheet Table

tbl_LAT_ALNTP_Worksheet
LabCaseID
	ItemID
	SampleID
	Analyst
	Witness
	Ldesignntn
	Substra
	Matrix
	Mediadevel
	Deposit
	DistorModerate
	MinorBloody
	Heavy
	minor
	LntPrint
	Type
	Level2dtl
	Level3dtl
	OallClarity
	Misce
	Exemplas
	PhotoScan
	DateCreated
	Comments
	TestResult

The various fields of the comparison, evaluation, & verification worksheet table are shown in Table 11-4. Comparison, evaluation, & verification worksheet data is stored and maintained in this data table

Table 11-4: Comparison, Evaluation, & Verification Worksheet Table

tbl_LAT_ComEvalVerif_Worksheet
LabCaseID
ItemID
SampleID
Analyst
Witness
Latent
Subject
Results
Individual
FingPalm
Verif
DateCreated
Comments
TestResult

The various fields of the analysis of exemplar prints worksheet table are shown in Table 11-5. Analysis of exemplar prints worksheet data is stored and maintained in this data table

Table 11-5: Analysis Of Exemplar Prints Worksheet Table

tbl_LAT_Exemplar_Worksheet
LabCaseID
ItemID
SampleID
Analyst
Witness
ItemNo
NofSubj
TPrintsElima
FingerPr
Source
Num
Type
OverlClar
PhotoScan
DateCreated
Comments
TestResult

The various fields of the technical procedures worksheet table are shown in Table 11-6. Technical procedures worksheet data is stored and maintained in this data table

Table 11-6: Technical Procedures Worksheet Table

tbl_LAT_TechProcedure_worksheet
LabCaseID
	ItemID
	SampleID
	Analyst
	Witness
	OtherList
	Positive
	ItemofEvi
	Prosequen
	PrintDev
	[Preserve]
	DateCreated
	Comments
	TestResult

11.2.3 Working with Latent Prints

Latent Prints home page requires username and password to verify user credentials, as shown in the Figure 11.5. After verifying credentials, a user is directed to list of items assigned to him/her for further processing.

Figure 11.5: Latent Prints Home Page

View Items Assigned

Figure 11.6 shows the list of items assigned to the analyst by the laboratory administration unit for further analysis. Initially, job status for the item assigned is set to “Job Pending”. The “View Details” hyperlink enables an analyst to view the details of the case. If the list of items assigned grows long i.e. more than 15 items, the record set is divided into multiple pages. Analysts can navigate between different pages by clicking on the header and footer navigation bar of the list.

The screenshot shows a web application titled "AssignedItemsList - Microsoft Internet Explorer". The address bar shows "http://localhost/LatentPrints/Forms/AssignedItemsList.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Blair, Tony F" and "Date: 7/12/2006". The sidebar on the left displays the "WEST VIRGINIA STATE POLICE" logo and the text "FORENSIC LABORATORY LATENT PRINTS". Below the logo are links for "Open Existing Case" and "Change Password". The main content area is titled "List of Item(s) Assigned" and contains a table with the following data:

LabCase #	Item ID	Date Assigned	Test Status
2006000004	2006000004-P-1-1-2	6/9/2006	Job Pending
2006000006	2006000006-P-2-1-4	7/6/2006	Job Pending
2006000007	2006000007-P-1-1-2	7/11/2006	Job Pending

The footer of the page shows the copyright notice "©2006 Rashpal S. Ahluwalia, West Virginia University" and the text "Local intranet".

Figure 11.6: Assigned Item List

Item Picture Management

This section describes the procedure of attaching pictures with an item. Analysts can perform two kinds of operation:

- View Pictures
- Upload Pictures

Analysts can access this section by clicking on the “*View/Upload Item Photo*” hyperlink in the item details section as shown in Figure 11.9. View picture section list the pictures already attached to the item with their thumbnails as shown in Figure 11.7. Analysts can also view the full size image by clicking on the image thumbnail. Full size image opens in a new window, which can be closed after use.

Figure 11.7: View Item Photo

Analysts can upload any digital photo in JPG format directly into the database using this section as shown in Figure 11.8. To upload an image into database, analysts are required to browse for the image path, set other required fields and click on the “*Upload the file*” hyperlink. On successful upload a thumbnail appears on the bottom of the page with a success message.

Figure 11.8: Upload Item Picture Section

Working with Samples

Analysts receive items from the CEP unit for further analysis and processing. Once received items are sub-divided into samples for conducting requested tests. Each item can be divided into one or more samples according to the requirement and complexity of the required test.

Analysts can create new, update or delete existing samples from the item details section as shown in Figure 11.9. To add a new sample analyst is required to provide description of sample and then click on “*Add Sample*” hyperlink. FIMS application automatically adds the time stamp to the item created. Initially, sample test status is set to “*Test Pending*” for the sample. Sample information can be updated by clicking on “*Edit*” hyperlink and existing sample can be deleted from the system by clicking on “*Delete*” hyperlink.

This section also enables analysts to view the final sample, sample photo, item, and item photo report. To access the individual sample/sample photo report analyst can click on “*View Report*” or “*Photo Sheet*” hyperlink. To view comprehensive item report analysts can click on “*Item Report*” or “*Item Photo Report*” at the bottom of the page.

To complete the process for item testing, the analyst is required to click on “*Item Test Complete*” button, as shown in Figure 11.9. Once clicked, analyst will not be able to make any alterations to the existing item test report.

Figure 11.9: Item Detail Section

Analysts can access this section by clicking on the “*View/Upload Sample Photo*” hyperlink in the item details section as shown in Figure 11.9. View picture section list the pictures already attached to the item with their thumbnails as shown in Figure 11.10. Analysts can also view the full size image by clicking on the image thumbnail. Full size image opens in a new window, which can be closed after use.

Figure 11.10: View Picture Section

Analysts can upload any digital photo in JPG format directly into the database using this section as shown in Figure 11.11. To upload an image analysts are required to browse for the image path, set other required fields and click on the “*Upload the file*” hyperlink to upload the image into database. On successful upload a thumbnail appears on the bottom of the page with a success message.

Figure 11.11: Upload Sample Picture Section

Choosing Test Worksheet

After sample creation, analysts are required to decide what kind of tests are required? Analysts are required to make decision of choosing type of test manually. Once decision is made the analyst can see the list of tests available, and then click “Choose Test” hyperlink as shown in Figure 11.12. FIMS application remembers the chosen sample ID during the process.

The worksheet for the latent prints unit are:

- ACE Analysis & Comparison for Inked Finger Prints
- AFIS & IAFIS Comparison Reference
- Analysis of Latent Prints
- Comparison, Evaluation, & Verification
- Analysis Of Exemplar Prints
- Technical Procedures

Figure 11.12: Choose Sample Test Section

ACE Analysis & Comparison for Inked Finger Prints Worksheet

ACE analysis & comparison for inked finger prints worksheet is used for filling information pertaining to ACE analysis & comparison for inked finger prints test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 11.13. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web application titled "ACEAnalysisComparison4Inkedprint - Microsoft Internet Explorer". The address bar displays the URL: `http://localhost/LatentPrints/Forms/ACEAnalysisComparison4Inkedprint.aspx?SID=2006000007-P-1-1-2-S-1`. The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information: "User:Blair, Tony F" and "Date:7/12/2006". A "Home | Log Out" link is also present.

The main content area is divided into two columns. The left column contains the "WEST VIRGINIA STATE POLICE" logo and the "FORENSIC LABORATORY LATENT PRINTS" logo. Below these logos is a list of links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password".

The right column contains the "ACE-V : Analysis, Comparison, Evaluation and Verification For Inked Fingerprint Comparison" form. At the top of this section is a "Save Results" button. Below the button, the form displays the following information:

- Labcasenumber: 2006000007
- Analyst: [Text Field]
- SampleID: 2006000007-P-1-1-2-S-1
- Witness: [Text Field]

The "Analysis and Comparison" section contains the following fields:

- N/A= Not Applicable
- Item Number: [Text Field]
- Subject name: [Text Field]
- Source: [None] (Dropdown)
- Number: [Text Field]
- Contributor: [Text Field]
- Date of arrest/offense/other: [Text Field]
- Quality: [None] (Dropdown)
- Fingers compared: [None] (Dropdown)
- Photo/Scan/Copy: [None] (Dropdown)

At the bottom of the form is a "General Comments:" section with a text area.

Figure 11.13: ACE Analysis & Comparison for Inked Finger Prints Worksheet

AFIS & IAFIS Comparison Reference Worksheet

AFIS & IAFIS comparison reference worksheet is used for filling information pertaining to AFIS & IAFIS comparison reference test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 11.14. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

AFISandIAFISComparisonReference - Microsoft Internet Explorer

Address: http://localhost/LatentPrints/Forms/AFISandIAFISComparisonReference.aspx?SID=2006000007-P-1-1-2-S-1

FORENSIC INFORMATION MANAGEMENT SYSTEM

User:Blar Date:7/1

Home

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY LATENT PRINTS

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Save Results

AFIS/IAFIS Lanch and Comparison Reference

Lab Case ID: 2006000007 Analyst:
SampleID: 2006000007-P-1-1-2-S-1 Witness:
Latent Designation
RFES Extension

SEARCH

Sex: Male Race: Native American Age:
Physical Data: Eyes: White Hair: White Height: 4'
Weight: POB: Database: AFIS
Type of Search: Feature Pattern Type: Right Slant Loop Finger Position: Right

RESULTS

Result: No Match Score: Score of Next Candidate:
CBI/FBI# ULF: Yes

Figure 11.14: AFIS & IAFIS Comparison Reference Worksheet

Analysis of Latent Prints Worksheet

Analysis of latent prints worksheet is used for filling information pertaining to analysis of latent prints test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 11.15. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "Analysisoflatentprints - Microsoft Internet Explorer". The address bar displays "http://localhost/LatentPrints/Forms/Analysisoflatentprints.aspx?SID=2006000007-P-1-1-2-S-1". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User:Blar, Tony F" and "Date:7/12/2006". A "Home | Log Out" link is also present. The main content area is titled "Analysis of Latent Prints" and contains a "Save Results" button. Below this, the form fields are organized into sections: "Lab Case ID: 2006000007", "Analyst:", "SampleID: 2006000007-P-1-1-2-S-1", "Witness:", and a key for "LL=Latent Lift; LP=Latent Photograph; LE=Latent Evidence". The "Latent Designation" section includes a text input field. The "Distortion:" section has a "Moderate" dropdown. The "Substrate" dropdown is set to "Substrate". The "Matrix" dropdown is set to "Matrix". The "Development Media" dropdown is set to "Development Media". The "Deposition" dropdown is set to "Deposition". The "Print" section includes a "Finger" dropdown, a "Left Slan Loop" dropdown, a "2nd Level details" dropdown set to "Insufficient", a "3rd Level details" dropdown set to "None", and an "Overall Clarity" dropdown set to "Sufficient for comparison". The "Exemplars Needed" dropdown is set to "None". The "Photo/Scan" dropdown is set to "Yes". The "Miscellaneous" section has a text input field. The bottom of the page shows a "Done" button and a "Local intranet" status bar.

Figure 11.15: Analysis of Latent Prints Worksheet

Comparison, Evaluation, & Verification Worksheet

Comparison, evaluation, & verification worksheet is used for filling information pertaining to comparison, evaluation, & verification test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 11.16. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "ComaparisonEvaluationVerification - Microsoft Internet Explorer". The address bar shows the URL: <http://localhost/LatentPrints/Forms/ComaparisonEvaluationVerification.aspx?SID=2006000007-P-1-1-2-S-1>. The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the text "WEST VIRGINIA STATE POLICE". Below this, there is a sidebar with the "FORENSIC LABORATORY LATENT PRINTS" logo and a list of links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password". The main content area features a "Save Results" button at the top. Below it, a blue header bar reads "Comparison, Evaluation and Verification of Latent Prints". The form contains fields for "Lab Case ID: 2006000007", "Analyst:", "SampleID: 2006000007-P-1-1-2-S-1", and "Witness:". A key is provided: "(Key: LL=Latent Lift; LP=Latent Photograph; LE=Latent Evidence)". A table with four columns is shown: "Latent", "Subject(s)/Item#", "Results", and "Individualized(Subject #)". The first row has input fields for the first three columns and a dropdown menu for the last column, currently set to "Need Additional Finger Prints". Below the table is a "General Comments:" section with a text area. At the bottom, there is a "Test Result:" section with a large text area. The browser's status bar at the bottom shows "Done" and "Local intranet".

Figure 11.16: Comparison, Evaluation, & Verification Worksheet

Analysis of Exemplar Prints Worksheet

Analysis of exemplar prints worksheet is used for filling information pertaining to analysis of exemplar prints test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 11.17. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "AnalysisOfExemplarPrints - Microsoft Internet Explorer". The address bar shows the URL: <http://localhost/LatentPrints/Forms/AnalysisOfExemplarPrints.aspx?SID=2006000007-P-1-1-2-S-1>. The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information: "User:Blar, Tony F" and "Date:7/12/2006". There are links for "Home" and "Log Out".

The main content area is titled "Analysis of Exemplar Prints" and contains the following fields and buttons:

- Save Results** button
- Lab Case ID:** 2006000007
- Analyst:** (empty text box)
- SampleID:** 2006000007-P-1-1-2-S-1
- Witness:** (empty text box)
- Item Number:** (empty text box)
- Name of subject:** (empty text box)
- Type of prints:** **Source:** **Number:**
- Type:** **Overall Clarity:** **Photocopied/Scanned:**
- General Comments:** (empty text box)

The left sidebar contains the "WEST VIRGINIA STATE POLICE" logo and the "FORENSIC LABORATORY LATENT PRINTS" logo. Below the logos are links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password".

Figure 11.17: Analysis Of Exemplar Prints Worksheet

Technical Procedures Worksheet

Technical procedures worksheet is used for filling information pertaining to analysis of Technical Procedures test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 11.18. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

TechnicalProcedures - Microsoft Internet Explorer

Address: http://localhost/LatentPrints/Forms/TechnicalProcedures.aspx?SID=2006000007-P-1-1-2-5-1

FORENSIC INFORMATION MANAGEMENT SYSTEM

User:Blair, Tony F
Date:7/12/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY LATENT PRINTS

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Save Results

Technical Procedure

Lab Case ID: 2006000007 Analyst:
SampleID: 2006000007-P-1-1-2-S-1 Witness:

KEY TO TECHNICAL PROCEDURE ABBREVIATIONS

Alternate Light = ALS + Setting	1,8 Diazaflouren - 9 - one =DFO	Physical Developer=PD	Powder Suspension=SUS
Amido Black = AB	Iodine = I	Powder=P+Type/Color	Rhodamine 6G=RD
Ardrox P-133D=ARD	Leucocrystal Violer = LCV	(Type: Standard=S	RD+ARD+MBD=RAM
Crystal Violer = CV	Ninhydrin=NIN	Magnetic=M ,Fluorescent=F	Small Particle=SPR
Cyanoacrylate = CA	P- Methoxybenzylamino - 4 -Nitrobenz - 2- Oxa-1,3- Diazole=MBD	Color=First letter of Color)	Visual = V

Other than

Figure 11.18: Technical Procedures Worksheet

Receive Item

Once an item is sent by CEP unit, Latent Prints unit analyst is responsible for receiving it by clicking on “*Receive*” button, under receive item section, as shown in Figure 11.19. This completes the handshaking process of item transfer between units.

Figure 11.19: Receive Item Section

Send Item

After completion of item testing, analyst is required to return the evidence item back to CEP unit. Figure 11.20 shows the section used to send an item back to the CEP unit. Analyst can use the drop down to select item ID and click on “Send” hyperlink, to send item back to CEP.

Figure 11.20: Send Item Section

Chain of Custody

Item chain of custody information is shown in Figure 11.21. FIMS application records used ID, unit name, and time stamp for tracking item chain of custody.

Chain Of Custody

Item Selected: 2006000007-P-1-I-2

Item ID	Sent Unit	Sent By	Date Sent	To Unit	Received By	Date Received	Status
2006000007-P-1-I-2	Central Evidence Processing	ps	7/11/2006 9:06:52 PM	Latent Prints Identification	lat1	7/12/2006 8:53:25 PM	Received
2006000007-P-1-I-2	Latent Prints Identification	lat1	7/12/2006 8:53:28 PM	Central Evidence Processing			Not Received

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Figure 11.21: Item Chain Of Custody

Change User Password

Analyst can change password through this section by providing appropriate credentials as shown in Figure 11.22.

The screenshot shows a web browser window titled "Change Password - Microsoft Internet Explorer". The address bar displays "http://localhost/LatentPrints/Forms/Changepass.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Blair, Tony F" and "Date: 7/12/2006". There are links for "Home" and "Log Out". The main content area is divided into two columns. The left column contains the "WEST VIRGINIA STATE POLICE" logo and the text "FORENSIC LABORATORY LATENT PRINTS". Below this, there are links for "Open Existing Case" and "Change Password". The right column is titled "Change Password" and contains a form with the following fields: "Username:" with the value "lat1", "Old Password:" with an empty text box, "New Password:" with an empty text box, and "Re-enter new Password:" with an empty text box. A "Submit" button is located below the "Re-enter new Password" field. The footer of the page displays "©2006 Rashpal S. Ahluwalia, West Virginia University".

Figure 11.22: Change Password Section

Exiting Latent Prints

Users can terminate the current session by clicking on “*Log Out*” hyperlink on the top right corner of the page.

11.2.4 Generating Item and Sample Reports

The analyst can generate the following types of reports

- Item Report
- Item Photo Report
- Sample Report
- Sample Photo Report

Figure 11.23 shows the item report, which is a cumulative report for all the samples. Figure 11.24 shows the sample report. This section also facilitate analyst to export report via PDF/MS-Word format, as shown in Figure 11.25 and Figure 11.26.

Figure 11.23: Item report

Figure 11.24: Sample Report

Figure 11.25: Sample Report in PDF Format

Figure 11.26: Item Report in MS Word Format

CHAPTER 12

QUESTIONED DOCUMENTS

12.1 Existing Questioned Documents Process

The Questioned Documents Unit is responsible for the examination of documents. The documents can be checks, withdrawal forms, credit card receipts, demand notes, suicide notes, anonymous letters, firearms transaction reports, insurance claim forms, and prescriptions. Watermarks can also be examined to determine the date and or manufacturer of the questioned paper. Questioned photocopies can be examined and linked back to a photocopier. Inks can be evaluated with differing wavelengths of light to determine if writing was added, or to visualize obliterated writing on questioned documents. Documents from computer printers can be classified as being produced from a dot matrix, ink jet or laser printer. The questioned documents unit also provides footwear and tire impression comparisons [16].

The analyst in the questioned documents unit receives the LEIF form and chain of custody form along with the evidence items. Samples are prepared from the items received from the storage. After the required tests are performed, appropriate forms are completed. The forms/worksheets used in this unit are: Footwear Examination (FE), Footwear Comparison (FC) and Tire Comparison (TC). Once the examinations are performed, evidence is returned to the CER and the secretary prepares a draft report. The draft report is reviewed by the analyst/reviewer. Upon approval, the final report is sent to CER. The existing process for this unit is shown in Figure12.1.

Figure 12.1: Existing Process for Questioned Documents Unit

12.2 Re-engineering the Questioned Documents Process

The analyst in the questioned documents unit receives the items assigned for further processing and analysis from CEP. Received items are sub-divided into samples for conducting the requested tests. An individual item may be divided into many samples according to the requirement and complexity of the required test. A report for each sample is generated. An item report is compiled by combining sample reports. After the report is received, the reports along with the test items are sent back to CEP for further processing. The evidence and information flow diagram is shown in Figure 12.2.

Figure 12.2: Step 5 Receive Assigned Items from CEP

Detail procedure followed by questioned documents unit for further processing and analysis is shown in Figure 12.3.

Figure 12.3: Detail Item Processing Procedure

12.2.1 Questioned Documents Entity Relationship Diagram

Questioned documents data tables are connected with each other through relations as shown in the figure 12.4

Figure 12.4: Entity Relationship Diagram

12.2.2 Questioned Documents Database Tables

The Questioned Documents unit module stores its data in the following tables

- Foot Comparison(tbl_Quest_FootCompar)
- Tire Examination (tbl_Quest_Tire)
- Foot Examination (tbl_Quest_Foot_Exam)

The various fields of the foot comparison worksheet table are shown in Table 12-

1. Foot comparison worksheet data is stored and maintained in this data table

Table 12-1: Foot Comparison Table

tbl_Quest_FootCompare
LabCaseID
	ItemID
	SampleID
	IDLocation
	Analyst
	Witness
	DesignDoc
	PhysicalDoc
	ConditionDoc
	IDDoc
	DesignSel
	PhysicalSel
	ConditionSel
	IDSel
	DateCreated
	Comments
	Results

- The various fields of the foot examination worksheet table are shown in Table 12-
2. Foot examination worksheet data is stored and maintained in this data table

Table 12-2: Tire Table

tbl_Quest_FootExam
LabCaseID
	ItemID
	SampleID
	IDLocation
	Analyst
	Witness
	PrimExam
	QNature
	Scale
	EnhanceTechq
	QImpression
	SimilaritiesOthers
	QSubstrate
	TreadPattern
	KSShoe
	KSBrand
	KSDoc
	KSTraceEvid
	KSTimeDiff
	DesignSel
	PhysicalSel
	ConditionSel
	IDSel
	DesignDoc
	PhysicalDoc
	ConditionDoc
	IDDoc
	DateCreated
	Comments
	Results

- The various fields of the tire examination worksheet table are shown in Table 12-
3. Tire examination worksheet data is stored and maintained in this data table

Table 12-3: Foot Examination

tbl_QUEST_Tire
LabCaseID
ItemID
SampleID
IDLocation
Analyst
Witness
PrimExam
QNature
Scale
EnhanceTechq
QImpression
SimilaritiesOthers
QSubstrate
TreadPattern
KSShoe
KSBrand
KSDoc
KSTraceEvid
KSTimeDiff
DesignDoc
PhysicalDoc
ConditionDoc
IDDoc
DateCreated
Comments
Results

12.2.3 Working with Questioned Documents

Questioned Documents home page requires username and password to verify user credentials, as shown in the Figure 12.5. After verifying credentials, a user is directed to list of items assigned to him/her for further processing.

Figure 12.5: Questioned Documents Home Page

View Items Assigned

Figure 12.6 shows the list of items assigned to the analyst by the laboratory administration unit for further analysis. Initially job status for the item assigned is set to “*Job Pending*”. The “*View Details*” hyperlink enables an analyst to view the details of the case. If the list of items assigned grows long i.e. more than 15 items, the record set is divided into multiple pages. Analysts can navigate between different pages by clicking on the header and footer navigation bar of the list.

AssignedItemsList - Microsoft Internet Explorer

Address: http://localhost/Questioned/Forms/AssignedItemsList.aspx

User:Connery, Sean L
Date:7/12/2006
Home | Log Out

FORENSIC INFORMATION MANAGEMENT SYSTEM

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY QUESTIONED DOCUMENTS

Open Existing Case
Change Password

List of Item(s) Assigned

LabCase ID	Item ID	Date Assigned	Test Status	
20060000004	20060000004-P-2-1-1	6/9/2006	Job Pending	Item Detail
20060000007	20060000007-P-2-1-3	7/11/2006	Job Pending	Item Detail

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Local intranet

Figure 12.6: Assigned Item List

Item Picture Management

This section describes the procedure of attaching pictures with an item. Analysts can perform two kinds of operation:

- View Pictures
- Upload Pictures

Analysts can access this section by clicking on the “*View/Upload Item Photo*” hyperlink in the item details section as shown in Figure 12.9. View picture section list the pictures already attached to the item with their thumbnails as shown in Figure 12.7. Analysts can also view the full size image by clicking on the image thumbnail. Full size image opens in a new window, which can be closed after use.

Figure 12.7: View Item Photo

Analysts can upload any digital photo in JPG format directly into the database using this section as shown in Figure 12.8. To upload an image into database, analysts are required to browse for the image path, set other required fields and click on the “*Upload the file*” hyperlink. On successful upload a thumbnail appears on the bottom of the page with a success message.

The screenshot shows a web application titled "Photo - Microsoft Internet Explorer" with the address bar displaying "http://localhost/Questioned/Forms/Photo.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Connery, Sean L" and "Date: 7/12/2006". A navigation menu on the left lists "WEST VIRGINIA STATE POLICE" and "FORENSIC LABORATORY QUESTIONED DOCUMENTS", along with links for "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password". The main content area features two buttons: "View Pictures" and "Upload Pictures". Below these is a "Photo Notes Sheet" section with fields for "LabCase#" (2006000007), "ItemID" (2006000007-P-2-I-3), "Select File" (with a "Browse..." button), "File Name", and "Notes". An "Upload the files >" button is positioned below the "Notes" field. At the bottom of the page, a green message states "Image file uploaded". The footer includes the copyright notice "©2006 Rashpal S. Ahluwalia: West Virginia University" and a "Local intranet" indicator.

Figure 12.8: Upload Item Picture Section

Working with Samples

Analysts receive items from the CEP unit for further analysis and processing. Once received items are sub-divided into samples for conducting requested tests. Each item can be divided into one or more samples according to the requirement and complexity of the required test.

Analysts can create new, update or delete existing samples from the item details section as shown in Figure 12.9. To add a new sample analyst is required to provide description of sample and then click on “*Add Sample*” hyperlink. FIMS application automatically adds the time stamp to the item created. Initially, sample test status is set to “*Test Pending*” for the sample. Sample information can be updated by clicking on “*Edit*” hyperlink and existing sample can be deleted from the system by clicking on “*Delete*” hyperlink.

This section also enables analysts to view the final sample, sample photo, item, and item photo report. To access the individual sample/sample photo report analyst can click on “*View Report*” or “*Photo Sheet*” hyperlink. To view comprehensive item report analysts can click on “*Item Report*” or “*Item Photo Report*” at the bottom of the page.

To complete the process for item testing, the analyst is required to click on “*Item Test Complete*” button, as shown in Figure 12.9. Once clicked, analyst will not be able to make any alterations to the existing item test report.

ItemDetail - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address http://localhost/Questioned/Forms/ItemDetail.aspx Go Links >>

WEST VIRGINIA STATE POLICE

**FORENSIC LABORATORY
QUESTIONED DOCUMENTS**

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Create/View Sample for Item

LabCase ID: 2006000007
Item ID : 2006000007-P-2-I-3
Item Name: Iron Rod
Item Description: Iron Rod (Suspect's car)
Exam Requested: Finger Prints Identification

Upload Item Photo

View/Upload Item Photos

List of Samples (Test Pending / In process)

Edit	Sample ID	Sample Description	Date Created	Test Status
Delete Edit	2006000007-P-2-I-3-S-2	sample 2	7/12/2006 9:14:36 PM	Test Pending Choose Add Test Photo
Delete Edit	2006000007-P-2-I-3-S-3	Sample 3	7/12/2006 9:14:47 PM	Test Pending Choose Add Test Photo

Add Sample

List of Samples (Test Done)

Sample ID	Sample Description	Date Created	Test Status
2006000007-P-2-I-3-S-1	sample 1	7/12/2006 9:14:31 PM	Test Done View Result Photo Sheet

List of Item Report(s)

View Item Report

Local intranet

Figure 12.9: Item Detail Section

Analysts can access this section by clicking on the “View/Upload Sample Photo” hyperlink in the item details section as shown in Figure 12.9. View picture section list the pictures already attached to the item with their thumbnails as shown in Figure 12.10. Analysts can also view the full size image by clicking on the image thumbnail. Full size image opens in a new window, which can be closed after use.

Figure 12.10: View Picture Section

Analysts can upload any digital photo in JPG format directly into the database using this section as shown in Figure 12.11. To upload an image analysts are required to browse for the image path, set other required fields and click on the “*Upload the file*” hyperlink to upload the image into database. On successful upload a thumbnail appears on the bottom of the page with a success message.

Figure 12.11: Upload Sample Picture Section

Choosing Test Worksheet

After sample creation, analysts are required to decide what kinds of tests are required? Analysts are required to make decision of choosing type of test manually. Once the decision is made the analyst can see the list of tests available, and then click “*Choose Test*” hyperlink as shown in Figure 12.12. FIMS application remembers the chosen sample ID during the process.

The worksheets for the questioned documents are:

- Foot Examination
- Foot Comparison
- Tire Comparison

Figure 12.12: Choose Sample Test Section

Foot Examination Worksheet

Foot Examination Worksheet is used for filling information pertaining to foot examination test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 12.13. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web application titled "Foot - Microsoft Internet Explorer". The address bar displays "http://localhost/Questioned/Forms/Foot.aspx?SID=2006000007-P-2-I-3-S-1". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Connery, Sean L" and "Date: 7/12/2006".

The main content area is divided into two columns. The left column contains the "WEST VIRGINIA STATE POLICE" logo and the text "FORENSIC LABORATORY QUESTIONED DOCUMENTS". Below this is a list of links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password".

The right column contains the "Footwear Examination Worksheet" form. At the top is a "Save Results" button. The form fields are as follows:

- LabCase ID: 2006000007
- Analyst: [Text Field]
- Item ID: [Text Field]
- Sample ID: 2006000007-P-2-I-3-S-1
- Witness: [Text Field]
- Date Created: [Text Field]

Below these fields is the "Shoe Examination" section, which includes the following fields:

- Preliminary Examination: [Text Field]
- Nature of Q: [Text Field]
- Scale Present: [Yes] (dropdown menu)
- Enhancement Technique: [Text Field]
- Q Impression: [Left] (dropdown menu)
- Similarities with Other: [Text Field]
- Q Substrate: [Text Field]
- Tread Pattern: [Text Field]

The bottom of the browser window shows the "Done" button and the "Local intranet" status.

Figure 12.13: Foot Examination Worksheet

Foot Comparison Worksheet

Foot comparison worksheet is used for filling information pertaining to foot comparison test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 12.14. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

Foot Comparison - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address http://localhost/Questioned/Forms/FootComparison.aspx?SID=2006000007-P-2-1-3-S-1 Go Links

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Connery, Sean L
Date: 7/12/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY QUESTIONED DOCUMENTS

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Save Results

Footwear Comparison Worksheet

Lab Case ID: 2006000007 Analyst:

Item ID: Witness:

Sample ID: 2006000007-P-2-1-3-S-1 Date Created:

Design: ☒ Fluid ☐ Viscous ☐ Clotted

Physical size & shape: ☒ Similar ☐ Different

General condition/wear: ☒ Similar ☐ Different

ID Characteristics: ☒ Similar ☐ Different

General Comments / Notes:

Test Result:

Figure 12.14: Foot Comparison Worksheet

Tire Comparison Worksheet

Tire Comparison Worksheet is used for filling information pertaining to tire comparison test performed on the sample by the analyst. After filling the required data fields, analyst is required to click on “*Save Results*” button located on top of the page, as shown in Figure 12.15. After saving the worksheet data, analyst can finalize and close the worksheet by clicking on “*Test Done*” button. The analyst cannot make any alterations in the worksheet once the “*Test Done*” button is clicked.

The screenshot shows a web browser window titled "Tire - Microsoft Internet Explorer". The address bar displays "http://localhost/Questioned/Forms/Tire.aspx?SID=2006000007-P-2-1-3-S-1". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Connery, Sean L" and "Date: 7/12/2006". A "Home | Log Out" link is also present. The main content area is titled "Tire Comparison Worksheet" and contains a "Save Results" button. The form fields are organized into two columns. The left column contains a sidebar with the "WEST VIRGINIA STATE POLICE" logo and a list of links: "Open Existing Case", "Item Details", "Chain Of Custody", "Send Items", "Receive Items", and "Change Password". The right column contains the following fields: "Lab Case ID: 2006000007", "Analyst:", "Item ID:", "Witness:", "Sample ID: 2006000007-P-2-1-3-S-1", "Date Created:", "Design:", "Physical size & shape:", "General condition/wear:", "ID Characteristics:", "Preliminary Examination:", "Nature of Q:", "Scale Present: Yes", "Enhancement Technique:", and "Q Impression: Left". The "Scale Present" and "Q Impression" fields are dropdown menus. The "Save Results" button is located at the top of the form area.

Tire Comparison Worksheet	
Lab Case ID: 2006000007	Analyst:
Item ID:	Witness:
Sample ID: 2006000007-P-2-1-3-S-1	Date Created:
Design:	
Physical size & shape:	
General condition/wear:	
ID Characteristics:	
Preliminary Examination:	
Nature of Q:	
Scale Present:	Yes
Enhancement Technique:	
Q Impression:	Left

Figure 12.15: Tire Comparison Worksheet

Receive Item

Once an item is sent by CEP unit, Questioned Documents unit analyst is responsible for receiving it by clicking on “*Receive*” button, under receive item section, as shown in Figure 12.16. This completes the handshaking process of item transfer between units.

Figure 12.16: Receive Item Section

Send Item

After completion of item testing, analyst is required to return the evidence item back to CEP unit. Figure 12.17 shows the section used to send an item back to the CEP unit. Analyst can use the drop down to select item ID and click on “Send” hyperlink, to send item back to CEP.

Figure 12.17: Send Item Section

Chain of Custody

Item chain of custody information is shown in Figure 12.18. FIMS application records used ID, unit name, and time stamp for tracking item chain of custody.

Chain Of Custody

Item Selected: 2006000007-P-2-1-3

Item ID	Sent Unit	Sent By	Date Sent	To Unit	Received By	Date Received	Status
2006000007-P-2-1-3	Central Evidence Processing	ps	7/11/2006 9:10:43 PM	Questioned Document	qst1	7/12/2006 9:12:59 PM	Received
2006000007-P-2-1-3	Questioned Document	qst1	7/12/2006 9:13:03 PM	Central Evidence Processing			Not Received

Figurer12.18: Item Chain Of Custody

Change User Password

Analyst can change password through this section by providing appropriate credentials as shown in Figure 12.19

The screenshot shows a web browser window titled "Change Password - Microsoft Internet Explorer". The address bar displays "http://localhost/Questioned/Forms/Changepass.aspx". The page header includes the "FORENSIC INFORMATION MANAGEMENT SYSTEM" logo and the user information "User: Connery, Sean L" and "Date: 7/12/2006". There are links for "Home" and "Log Out". The main content area is divided into two columns. The left column features the "WEST VIRGINIA STATE POLICE" logo and the text "FORENSIC LABORATORY QUESTIONED DOCUMENTS". Below this, there are links for "Open Existing Case" and "Change Password". The right column is titled "Change Password" and contains a form with the following fields: "Username:" (pre-filled with "qst1"), "Old Password:" (text input), "New Password:" (text input), and "Re-enter new Password:" (text input). A "Submit" button is located below the "Re-enter new Password" field. The footer of the page indicates "©2006 Rashpal S. Ahluwalia, West Virginia University".

Figure 12.19: Change Password Section

Exiting Questioned Documents

Users can terminate the current session by clicking on “*Log Out*” hyperlink on the top right corner of the page.

12.2.4 Generating Item and Sample Reports

The analyst can generate the following types of reports

- Item Report
- Item Photo Report
- Sample Report
- Sample Photo Report

Figure 12.20 shows the item report, which is a cumulative report for all the samples. Figure 12.21 shows the sample report. This section also facilitate analyst to export report via PDF/MS-Word format, as shown in Figure 12.22 and Figure 12.23.

Report_ItemReport - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Go Links

Address http://localhost/Questioned/Forms/Report_ItemReport.aspx

FORENSIC INFORMATION MANAGEMENT SYSTEM

User:Connery, Sean L
Date:7/12/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY QUESTIONED DOCUMENTS

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Export Via PDF Export Via MSWORD Print Report

Item Report

1 of 1 100% powered by crystal

Forensic Laboratory

Item Report

Questioned Document Unit

Lab Case ID: 2006000007
Package ID: 2006000007-P-2
Item ID: 2006000007-P-2-I-3

Item Description:
Iron Rod (Suspect's car)

Sample ID: 2006000007-P-2-I-3-S-1
Sample Description: sample 1

Test Result:

Figure 12.20: Item report

Reports - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address http://localhost/Questioned/Forms/Report_Tire.aspx?SID=2006000007-P-2-I-3-S-1

Go Links

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Connery, Sean L
Date: 7/12/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY QUESTIONED DOCUMENTS

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Export Via PDF Export Via MSWORD Print Report

Sample Report

1 of 1 100% powered by crystal

Forensic Laboratory Questioned Documents Unit

Tire Comparison Report

Lab Case ID: 2006000007 Analyst: qst1
Item ID: 2006000007-P-2-I-3 Witness:
Sample ID: 2006000007-P-2-I-3-S-1 Date Created: 7/12/2006 9:17:37PM

Shoe Examination

Preliminary Examination: Nature of Q:
Scale Present: Yes Enhancement Technique:
Q Impression: Left Q Substrate:
Similarities with Other:

Done Local intranet

Figure 12.21: Sample Report

Report_SamplePhoto - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address http://localhost/Questioned/Forms/Report_SamplePhoto.aspx?SID=2006000007-P-2-I-3-S-1

Go Links

FORENSIC INFORMATION MANAGEMENT SYSTEM

User: Connery, Sean L
Date: 7/12/2006

Home | Log Out

WEST VIRGINIA STATE POLICE

FORENSIC LABORATORY QUESTIONED DOCUMENTS

Open Existing Case
Item Details
Chain Of Custody
Send Items
Receive Items
Change Password

Export Via PDF Export Via MSWORD Print Report

Sample Photo Report

1 of 3 100% powered by crystal

Forensic Laboratory Questioned Documents Unit

Sample Photo Sheet

Lab Case ID: 2006000007
Item ID: 2006000007-P-2-I-3
Sample ID: 2006000007-P-2-I-3-S-1

Image name Image

Document.jpg

Notes

Done Local intranet

Figure 12.22 Item Photo Report

Figure 12.23: Item report in PDF Format

Figure 12.24: Item report in Item Format

CHAPTER 13

CONCLUSIONS AND FUTURE WORK

13.1 Conclusions

The focus of this research was on the design and implementation of a web based forensics information management system, FIMS 3.0 for the WVSPFL. The existing processes were examined and streamlined to develop FIMS 3.0. The software was implemented with ASP.NET (.NET Framework 1.1) as the front end and MS SQL Server 2000 as the database. The system can be accessed online from any Internet browser.

The new system of submitting cases, maintaining chain of custody, and filling appropriate test worksheets online for each unit in the laboratory provides the functionality and capability that did not exist earlier. It allows the law enforcement agencies to check the status of a case and to share data with other law enforcement agencies. Separate modules were developed for all the functional units in the forensics laboratory. A module for case submission by the ORI agencies was also developed. The system replicates the existing paper based forms and heads in the direction of making the lab operations a paperless facility. It provides information across functional levels, establishing easy communication, and improving process performance.

FIMS 3.0 software is expected to:

- Reduce the handwritten paperwork
- Improve data reliability.
- Provide a uniform approach to case reporting.
- Reduce case backlog.
- Eliminate duplication of work.
- Generate case statistics

The key capabilities of the system are:

- Accessible from anywhere on the web
- Enhanced communication between the law enforcement agencies and the forensics laboratory
- Check the status of the cases submitted to the laboratory
- Easy printing of the reports and worksheets
- Maintains chain of custody records
- Store Images/Pictures in the database

13.2 Future Work

FIMS 30 lays a foundation upon which additional capabilities could be developed. Some of the items for future work (in arbitrary order) are listed below:

- Deployment of FIMS at ORI agencies
- Bar code printing and scanning of case numbers and item numbers
- Use of FIMS for onsite collection and cataloging of crime data
- Development of a module to store and retrieve video clips
- Development of a direct link between FIMS and other crime databases
- Development of a direct link between FIMS and various hardware and software used by the analysts in the laboratory and at the crime scene
- Design and implementation of a “Management” module to keep track of work load and training needs of the laboratory staff
- Design and implementation of a module to compute case statistics (cases submitted, cases pending, cases solved, cases unsolved, etc.)
- Development of item testing section in central processing unit.
- Deployment of FIMS on a hand held device

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