DESIGN RESEARCH IN THE CONTEXT OF FEDERAL LAW ENFORCEMENT

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INTRODUCTION
Design research facilitates the conceptual development, planning and making of products that meet the needs of human beings.
DESIGN RESEARCH

Helps us identify the needs of future users.

Integrates specialized knowledge into meaningful solutions.

Creates structured and productive conversations among team members and the client.

Builds credibility of the team and their process.

Creates value for the client.
INTRODUCTION

Exploratory Helps us understand people and their behaviors, perceptions, experiences, needs and desires.
Generative

Provides for effective development of new ideas and concepts, leading to innovation.
Evaluative
Helps systematically test products for their usability, usefulness and desirability.
INTRODUCTION

DESIGN RESEARCH IN CONTEXT

Evidence Processing Application
PROJECT OVERVIEW

Client
Federal Law Enforcement Agency

Challenge
Create a software and hardware solution to automate and standardize the processing and collection of paper-based evidence using OCR.

Resources
18 Months | Team of 3–7 | 50–100% effort
PROCESS OVERVIEW

APPLICATION

Research
Secondary Research
Contextual Inquiry
Literature Review
Hardware Assessment

Synthesis
Stakeholder Matrix
Current System Model
Task Flow Analysis
Content Analysis
Key Findings
Design Implications

Concept Development
System Components Model
Hardware Architecture
System Workflow
User Workflow
Software Architecture
Wireframes
Interactive Prototype
Concept Validation
Identity Standards
Screen Designs

Implementation
Agile Software Development
Task Completion Testing
Iterative Deployments
Usability Testing
Unit Tests

Transition
Collaborative Integration
Stakeholder Touchpoints
Expansion Proposals

DOCUMENTATION

Needs Assessment
System Requirements Specification
System Design Document
Concept Validation Report
Usability Testing Plan
Technical Documentation
User Guide
Training Materials
DESIGN RESEARCH CHALLENGES

Laws and regulations affecting our access to data and target audience.

Working in the data-sensitive realm of cybersecurity, digital intelligence, and evidence processing.

Restricted physical access to people and places to conduct design research.

Dissemination of information stemming from the gathered data.
CONTEXTUAL INQUIRY

Immersive observation and interviewing of people that reveals underlying (and invisible) work structure.

Data
Visits to 5 field offices
Six 2-hour sessions

Purpose
Understand our future users, their environment and current processes.
Uncover tacit knowledge.
STAKEHOLDER RESPONSIBILITY MATRIX

Maps the key participants and their responsibilities within a defined workflow.

Purpose
Understand the varying roles and needs for the new solution.
Identify the primary user to keep in mind when making design decisions.
TASK FLOW ANALYSIS

Breaks down the elements of a user’s workflow, including actions and interactions, system response, and environmental context.

Data
Observed steps
Discrepancies
Pain points

Purpose
Understand the primary user’s current sequence of tasks so that the future solution could enable their completion.
CURRENT SYSTEM MODEL

Visualizes the interactions, connections and breakdowns among actors, artifacts and technology.

Data
Observed steps
Discrepancies
Pain points

Purpose
Analyze the communication and data flows among the various elements of the observed system
Lack of automation causing significant delays and breakdowns within the entire process.

Manual processing and entry of information was very tedious and allowed for human error.

Overwhelming amounts of evidence and related information.

Purposeful omission of information occurred to speed up the process.

Untimely intelligence gathering.
DESIGN IMPLICATIONS

Integrate with existing systems and databases to **close the information gap**.

Use high-speed scanners to **automate the intake** of evidence and related information.

Use OCR technology to provide efficient, complete and **accurate records**.

Provide **contextual information** to aid in intelligence gathering and pattern identification.

Create a **unified methodology** to help standardize processing.
CONCEPT DEVELOPMENT
Define the overall system stages and individual steps of a process.

**Purpose**
Define a unified methodology and approach for evidence processing.
Define specific software and hardware requirements.
SYSTEM WORKFLOW 1 (ABSTRACTED)
## USER WORKFLOW 1 (ABSTRACTED)

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Step Description</td>
<td>Step Description</td>
</tr>
<tr>
<td>2</td>
<td>Step Description</td>
<td>Further instructions or notes about Step 5.</td>
</tr>
<tr>
<td></td>
<td>Further instructions or notes about Step 2.</td>
<td>Another note about Step 5.</td>
</tr>
<tr>
<td>3</td>
<td>Step Description</td>
<td>Instructions on how to handle a special use case during Step 5.</td>
</tr>
<tr>
<td>4</td>
<td>Step Description</td>
<td>Step Description</td>
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<tr>
<td></td>
<td>Further instructions or notes about Step 4.</td>
<td>Further instructions or notes about Step 5.</td>
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<td>Another note about Step 4.</td>
<td>Another note about Step 5.</td>
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<tr>
<td></td>
<td>Instructions on how to handle a special use case during Step 4.</td>
<td>Instructions on how to handle a special use case during Step 5.</td>
</tr>
</tbody>
</table>
WIREFRAMES

Visualize the identified requirements and establish content and functionality in the form of a simplified graphical user interface.

Purpose
Establish core functionality.
Validate high level requirements with the client.
Validate concept and overall workflow.
WIREFRAME 1 (ABSTRACTED)

Process

Notifications

- 2 System Notifications
- 4 Pending Receipts
- 16 Incomplete Records
- 8 Incomplete Daily Activity

Daily Activity

- Today
- Jan 23
- Jan 22
- Jan 21

Last Week

- Jan 18
- Jan 17
- Jan 16
- Jan 15
- Jan 14

Analytics

2,377

Processed
WIREFRAME 1 (ABSTRACTED)

Analytics

Reminders

- Aenean orci feils, viverra in fermentum et, laoreet ut purus. Integer vehicula. by mm/dd
- Aenean orci feils, viverra in fermentum et, laoreet ut purus. Integer vehicula. by mm/dd
- Aenean orci feils, viverra in fermentum et, laoreet ut purus. Integer vehicula. by mm/dd
- Aenean orci feils, viverra in fermentum et, laoreet ut purus. Integer vehicula. by mm/dd
- Aenean orci feils, viverra in fermentum et, laoreet ut purus. Integer vehicula. by mm/dd
- Aenean orci feils, viverra in fermentum et, laoreet ut purus. Integer vehicula. by mm/dd

Monthly Activity

- Jan
- Feb
- Mar
- Apr
- May
- Jun
- Jul
- Aug
- Sep
- Oct
- Nov
- Dev

2,378
Processed Evidence

150
Pending
CONCEPT VALIDATION / TESTING

Combined wireframes, task completion analysis, usability testing and a survey to create an interactive PDF to test the concept.

Data
4-hour teleconference call with 27 participants from 24 field offices.

Purpose
Validate concept with future users. Get feedback for future iterations.
IMPLEMENTATION
PAPER-BASED DATA CAPTURE FORMS

Record session feedback in the absence of remote testing technology and direct observation.

Purpose
Gather feedback from participants to further improve the solution and user experience.

Gather metrics on process improvement.
# PAPER-BASED DATA CAPTURE FORMS

<table>
<thead>
<tr>
<th></th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>Day 5</th>
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</thead>
<tbody>
<tr>
<td>How much evidence did you scan?</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>How long did it take?</td>
<td>START</td>
<td>END</td>
<td>START</td>
<td>END</td>
<td>START</td>
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<td>hh:mm</td>
<td>hh:mm</td>
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<tr>
<td>Was any evidence unscannable?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>If yes,</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>· How many?</td>
<td></td>
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<tr>
<td>· Why? (e.g., Torn? Taped? Fragile?)</td>
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</tbody>
</table>
CONCLUSION
PROCESS IMPROVEMENT

Stages

Process Automation

1 2 3 4

Improved

Former

Low

Medium

High
PROCESS IMPROVEMENT

Manual Work

Former

Improved

Stages
1
2
3
4

High
Medium
Low

CONCLUSION
PROCESS IMPROVEMENT

![Graph showing process improvement stages and record accuracy](image)
THANK YOU!

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SOURCES


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