Web Application for Voiland Food Pantry

Project Requirements and Specifications

FIZ, VCSS

11-FA25-SP26-F-WEB

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I. Introduction

Food insecurity for college students is a rising problem, which directly affects students' overall well-being and academic performance. Many students face financial stress that may impact their ability to afford necessities such as food. According to the GAO report on student food insecurity, ". . . an estimated 23 percent of students (3.8 million) reported experiencing food insecurity. [1]" The Voiland College of Engineering and Architecture (VCEA) works to lift this burden from the shoulders of students, faculty, and staff with a food pantry that supplies non-perishable food items. Volunteers help to ensure pantry operations run smoothly while also providing them with volunteer hours.

This food pantry operates using a paper sign-in sheet for clientele to provide information for the purposes of funding. Relying solely on manual processes can be time-consuming, inefficient, and difficult to properly manage. This project seeks to make this process easier for food pantry customers, administrators, and volunteers by integrating a Cougar Card swiping system with a custom domain website created using WordPress. Our goal is to create a sign-in method that is easy to use, trustful, and preferable for all parties and handles clientele information, tracks inventory data as well as volunteer hour tracking.

II. System Requirements Specification

The System Requirements Specification details the key functional and non-functional requirements for the Voiland Food Pantry & Wellness Center Data Tracker. Functional requirements focus on core system capabilities such as card reader integration, barcode scanning, website sign-in, and administrative reporting. Non-functional requirements outline operational qualities, such as performance, security, and usability.

This section also includes use cases and user stories that demonstrate real-world interactions between users and the system. Each use case is linked to the relevant functional requirement, ensuring a cohesive system design that aligns with stakeholder expectations.

II.1. Functional Requirements

Each functional requirement is listed below with a detailed description, source, and priority level.

II.1.1 User Management

[FR-1]: User Registration

Description	The system shall allow admin to register users to login using valid credentials.
Source	Requirements elicitation from the client.
Priority	Level 0 (Essential)

[FR-2]: User Sign-In

Description	The system shall allow users to sign in via the website or card reader, distinguishing between customer and volunteer roles.
Source	Requirements elicitation from the client.

Priority	Level 0 (Essential)

II.1.2 Inventory and Volunteer Management

[FR-3]: Card Swipe Data

Description	The system shall read user card data into the database upon swipe.
Source	Requirements elicitation from the client.
Priority	Level 0 (Essential)

[FR-4]: Barcode Scanning

Description	The system shall scan food item barcodes into the database and update inventory status.
Source	Client request
Priority	Level 0 (Essential)

[FR-5]: Inventory Database

Description	The system shall maintain a database of all pantry inventory items.
Source	Requirements elicitation from the client.
Priority	Level 0 (Essential)

[FR-6]: Volunteer Database

Description	The system shall maintain a database of volunteer information and hours worked.
Source	Requirements elicitation from the client.
Priority	Level 0 (Essential)

[FR-7]: Administrative Reporting

Description	The system shall allow supervisors to generate and print reports for volunteer and inventory data.
Source	Internal requirements elicitation among member of the team.
Priority	Level 1 (Desirable)

[FR-8]: Administrative Login

Description	The system shall allow administrative access to edit and manage databases.
Source	Requirements elicitation from the client.

Priority	Level 0 (Essential)

[FR-9]: WordPress User Interface

Description	The system shall provide a user interface on WordPress that is compatible with the WSU website.
Source	Requirements elicitation from the client and alignment with WSU web standards.
Priority	Level 0 (Essential)

[FR-10]: Low Stocks Alerts

Description	The system shall alert administrators when stock of an item falls below a set threshold via dashboard and email.
Source	Internal requirements elicitation among team members.
Priority	Level 1 (Desirable)

II.2. Non-Functional Requirements

The non-functional requirements outline the system's operational qualities, such as performance, security, and usability, to ensure it meets quality standards beyond core functionality.

Non-Functional Requirement	Description
[NFR-01] Security	The system shall encrypt and secure all database data.
[NFR-02] Performance	The system shall verify card swipe and barcode reader data within 3 seconds.
[NFR-03] Uptime	The system shall maintain an uptime of at least 99%.
[NFR-04] Accuracy	The barcode reader shall scan items with at least 99% accuracy.
[NFR-05] Usability	The website interface shall follow WSU Web Standards and Style Guide for typography, UI elements, and navigation.
[NFR-06] Learnability	At least 80% of users shall complete tasks without assistance after ≤20 minutes of familiarization.
[NFR-07] Reporting	The system shall generate reports for datasets ≤10,000 records within 5 seconds.

II.3. Use Cases

The use cases describe common scenarios of user interactions with the system, explaining how various functional requirements are applied in specific situations. The use cases of the proposed are represented in the use case diagram given in Figure 1.

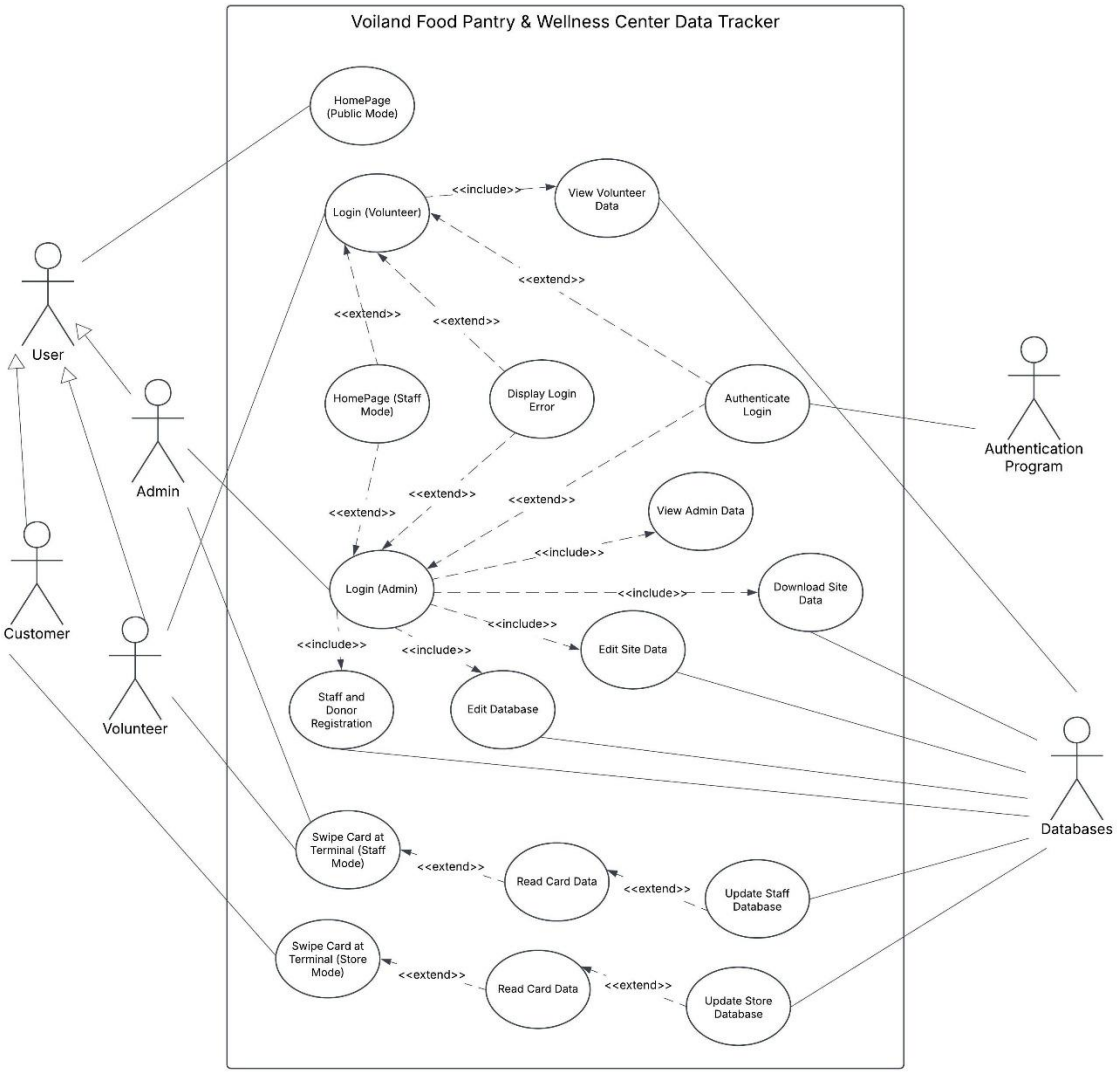

Figure 1: Use Case Diagram

The description of each use case is given below.

Use Case 1: Customer Sign-In

Actors	Pantry Customer (Student, Faculty, or Staff)
Pre-condition	• The customer is at the pantry.

	• Card reader and/or website is available and operational. • Customer has a valid Cougar Card.
Post-condition	• Customer visit is recorded in the database. • Volunteer and administrative records are updated.
Main Flow	• Customer approaches the pantry terminal. • Customer swipes Cougar Card at the reader. • System verifies the card and logs the visit. • Confirmation message displayed to customer.
Alternative Flow	**Alternative Flow 1 (Website Backup):** 1. Card reader is unavailable or card is not present. 2. Customer enters information through the website form. 3. System records visit in the database. **Alternative Flow 2 (Paper Backup):** 1. Both card reader and website are unavailable. 2. Customer signs in on paper form. 3. Volunteer later enters data into the system manually.
Related Requirements	• [FR-2]: User Sign-in • [FR-3]: Card Swipe Data

Use Case 2: Volunteer Hour Logging

Actors	Pantry Volunteer
Pre-condition	• Volunteer is present at the pantry. • Card reader and/or website are operational. • Volunteer has a valid Cougar Card.
Post-condition	• Volunteer hours are recorded in the database. • Administrators can access accurate volunteer records.
Main Flow	• Volunteer approaches the terminal. • Volunteer swipes Cougar Card at the reader. • System verifies the card and logs volunteer hours. • Confirmation message displayed to volunteer.
Alternative Flow	**Alternative Flow 1 (Website Backup):** 1. Card readers are unavailable, or card is not present. 2. Volunteer enters information on the website.

	3. System records volunteer hours in the database. **Alternative Flow 2 (Paper Backup):** 1. Both card reader and website are unavailable. 2. Volunteer records hours on paper form. 3. Administrator enters hours into the database later.
Related Requirements	• [FR-2]: User Sign-In • [FR-3]: Card Swipe Data • [FR-6]: Volunteer Database

Use Case 3: Inventory Update via Barcode Scanning

Actors	Pantry Volunteer / Pantry Staff
Pre-condition	• Volunteer/Staff is present at the pantry. • Barcode scanner is connected and operational. • Item to be stocked or distributed is available.
Post-condition	• Food inventory database is updated with new items or adjusted quantity.
Main Flow	• Volunteer scans food item barcode. • System retrieves item details or prompts entry if item is new. • Inventory count is updated in the database. • Confirmation message is displayed.
Alternative Flow	**Alternative Flow 1 (Manual Entry):** 1. Barcode scanner is unavailable. 2. Volunteer manually enters item code and details into system. 3. Database updates accordingly.
Related Requirements	• [FR-4]: Barcode Scanning • [FR-5]: Inventory Database

Use Case 4: Generate Administrative Reports

Actors	Pantry Administrators / Supervisors
Pre-condition	• Administrator is logged in with valid credentials. • Database contains up-to-date volunteer and/or inventory data.

Post-condition	• Report is generated and available in printable or downloadable format.
Main Flow	• Administrator logs in to the system. • Administrator selects type of report. • System retrieves relevant data. • Report is generated and displayed in chosen format.
Alternative Flow	**Alternative Flow 1 (Manual Entry):** 1. Administrator chooses to export data. 2. Report is saved as CSV/PDF for external use.
Related Requirements	• [FR-7]: Administrative Reporting • [FR-8]: Administrative Login

Use Case 5: Low Stock Alert

Actors	Pantry Administrators
Pre-condition	• Inventory items exist in database and set quantity thresholds. • System is actively monitoring inventory updates.
Post-condition	• Administrator is alerted about low stock items via dashboard notification or email.
Main Flow	• Volunteer scans item and inventory is updated. • System checks stock levels against thresholds. • If stock is below threshold, alert is triggered. • Administrator receives dashboard notification and/or email.
Alternative Flow	**Alternative Flow 1 (Threshold Adjustment):** 1. Administrator adjusts stock threshold. 2. System recalibrates alerts accordingly.
Related Requirements	• [FR-5]: Inventory Database • [FR-10]: Low Stocks Alert

Use Case 6: Administrative Login and Database Management

Actors	Pantry Administrators
Pre-condition	• Administrator has valid login. • System is operational and connected to database.

Post-condition	• Administrator is logged in with elevated access rights. • Database can be updated or managed as needed.
Main Flow	• Administrator navigates to login page. • Administrator enters credentials. • System verifies credentials and grants access. • Administrator registers new user logins/ edits volunteer/inventory data/ downloads data.
Alternative Flow	**Alternative Flow 1 (Failed Login):** 1. Administrator enters incorrect credentials. 2. System denies access and prompts reentry.
Related Requirements	• [FR-1]: User Registration • [FR-5]: Inventory Database • [FR-6]: Volunteer Database • [FR-8]: Administrative Login

II.4. Selected User Stories

The following user stories describe specific actions a user can take in the system, detailing what the user wants to accomplish and why. Each user story specifies system behaviors clearly.

User Story US-1: User Sign-In

As a food pantry user, I want to sign in using my WSU card or website so that my visit is registered.

Feature: Card Sign-In

Scenario: Customer uses WSU card

- **Given:** I am in the food pantry
- **When:** I swipe my WSU card at the card reader
- **Then:** My visit is recorded in the database
- **And:** My role (customer or volunteer) is correctly identified

Feature: Website Sign-In Backup

Scenario: Customer uses website

- **Given:** I am in the food pantry
- **When:** The card reader is unavailable, or I do not have my card
- **Then:** I can sign in using the website

- **And:** My visit is recorded in the database

Feature: Paper Sign-In Backup

Scenario: Card reader and website are unavailable

- **Given:** I am in the food pantry
- **When:** Both card reader and website are inoperable
- **Then:** I sign in on paper
- **And:** A volunteer later enters the visit into the database

User Story US-2: Barcode Scanning for Inventory

As a pantry volunteer, I want to scan items so that the inventory database is updated.

Feature: Inventory Barcode Scanning

Scenario: Successful scan

- **Given:** I am a volunteer in the pantry
- **When:** I scan an item with the barcode scanner
- **Then:** The item is added or updated in the inventory database

Feature: Manual Inventory Entry

Scenario: Barcode scanner fails

- **Given:** I am a volunteer in the pantry
- **When:** The barcode scanner fails
- **Then:** I record the item on a paper form
- **And:** I later update the database manually

User Story 3: Administrator Login for Editing

As a pantry administrator, I want to log in to edit volunteer data.

Feature: Admin Login

Scenario: Successful login

- **Given:** I am an administrator
- **When:** I log in with valid credentials
- **Then:** I can access and edit volunteer data
- **And:** I can register new volunteers
- **And:** The changes are saved in the database

Scenario: Login failure

- **Given:** I am an administrator
- **When:** I enter invalid credentials

- **Then:** Login fails
- **And:** I remain on the login page

Scenario: Database unavailable

- **Given:** I am logged in
- **When:** The database is unavailable
- **Then:** I record changes on paper or another program
- **And:** Technical issues are reported

The additional use stories are given on Appendix-1.

II.5. Traceability Matrix

The table below maps functional requirements to their respective use cases and user stories. This ensures that all requirements are accounted for and linked to user scenarios.

Functional Requirement	Use Case	User Story	Priority
[FR-1]: User Registration	UC-6: Administrative Login and Database Management	US-3: As a user, I want to register an admin account with the website.	Level 0
[FR-2]: User Sign-In	UC-1: Customer Sign-In UC-2: Volunteer Hour Logging	US-1: As a user, I want to sign in using my Cougar Card or the website.	Level 0
[FR-3]: Card Swipe Data	UC-1: Customer Sign-In UC-2: Volunteer Hour Logging	US-1: As a user, I want to entrust the food pantry with my Cougar Card data.	Level 0
[FR-4]: Barcode Scanning	UC-3: Inventory Update via Barcode Scanning	US-2: As a pantry volunteer, I want to scan items' barcodes.	Level 0
[FR-5]: Inventory Database	UC-3: Inventory Update via Barcode Scanning UC-5: Low Stock Alert UC-6: Administrative Login and Database Management	US-4: As a pantry administrator, I want to access and maintain inventory data. US-8: As the system, I want to notify administrators when stock is low so that inventory can be replenished in time.	Level 0

[FR-6]: Volunteer Database	UC-2: Volunteer Hour Logging UC-4: Generate Administrative Reports UC-6: Administrative Login and Database Management	US-3: As a user, I want to register an admin account with the website. US-5: As a pantry administrator, I want to access and maintain volunteer data.	Level 0
[FR-7]: Administrative Reporting	UC-4: Generate Administrative Reports UC-6: Administrative Login and Database Management	US-4: As a pantry administrator, I want to access and maintain inventory data. US-5: As a pantry administrator, I want to access and maintain volunteer data.	Level 1
[FR-8]: Administrative Login	UC-6: Administrative Login and Database Management	US-3: As a pantry administrator, I want to log in to edit volunteer and inventory data.	Level 0
[FR-9]: WordPress User Interface	UC-1: Customer Sign-In UC-2: Volunteer Hour Logging UC-6: Administrative Login and Database Management	US-1: As a user, I want to sign in using my Cougar Card or the website. US-3: As a pantry administrator, I want to log in to edit volunteer and inventory data. US-6: As a food pantry donator, I want to access the food pantry website so that I can contact supervisors. US-7: As a customer, I want to access the food pantry website so that I can view the hours.	Level 0

[FR-10]: Low Stock Alert	UC-5: Low Stock Alert	US-8: As the system, I want to send an alert to pantry administrators when stock of a particular item is low.	Level 1

II.6 Other Related UML Diagrams

The diagram shown in Figure 2 was drafted by the team working on the system's databases (Cristobal Escobar and Alan Sun) to visualize the potential structure of this application's data.

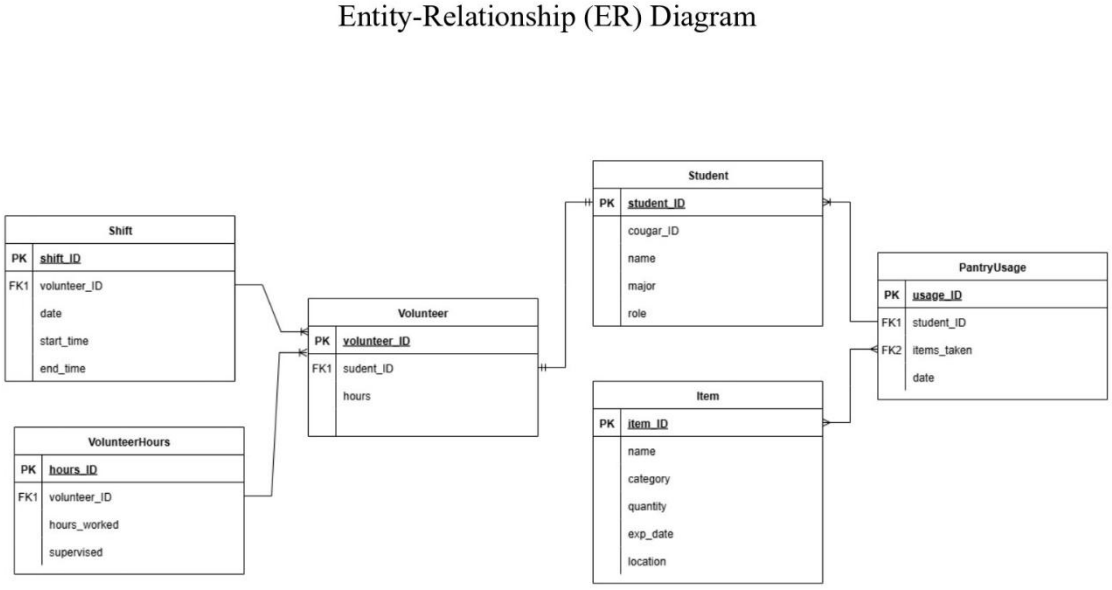

Figure 2: Entity-Relationship (ER) Diagram

III. System Evolution

The Voiland Food Pantry & Wellness Center data tracker needs to be flexible and scalable to handle growth in both users and inventory. The database will be designed to expand easily as more food items and volunteer records are added, keeping the system accurate and responsive.

The interface will remain fast and easy to use even as the amount of data grows, so customers, volunteers, and administrators can interact with the system smoothly. Admins will be able to manage inventory, track volunteer hours, and generate reports without needing advanced technical skills.

The system will use a modular design, so new features—like automated alerts or additional reports—can be added without disrupting existing functionality. We'll also work with pantry staff to make sure updates and changes fit their needs and are easy to use.

IV. Standards

This project aims to adhere to professional standards relevant to the development, documentation, and design processes throughout the project's creation timeline. We will ensure structured, standardized documentation practices by following **IEEE 830** and **IEEE 1016.** This application must follow **W3C WCAG 2.2** to provide web content accessibility for clientele, volunteers, and administrators of the Voiland Food Pantry. Finally, while personal data will not be collected by this application, it will still follow the **ACM Code of Ethics** to guarantee our team stays mindful of professionalism and fairness during this process.

V. Appendix-1

Additional User Stories

The following are additional user stories for reference.

User Story 4: Inventory Data Reporting

As a pantry administrator, I want to access inventory data so that I can print reports.

Feature: Access Inventory Data

Scenario: Normal access

- **Given:** I am an administrator for the pantry
- **When:** I access the inventory database
- **Then:** I can view current inventory data
- **And:** I can generate and print reports

Scenario: Database not functional

- **Given:** I am an administrator for the pantry
- **When:** The inventory database is down
- **Then:** I use paper records and past reports
- **And:** I generate reports manually
- **And:** The technical issue is reported for repair

User Story 5: Volunteer Data Reporting

As a pantry administrator, I want to access volunteer data so that I can print reports.

Feature: Access Volunteer Data

Scenario: Normal access

- **Given:** I am an administrator for the pantry
- **When:** I access the volunteer database

• **Then:** I can view current volunteer data
• **And:** I can generate and print reports
Scenario: Database not current
• **Given:** I am an administrator for the pantry
• **When:** The volunteer database is outdated
• **Then:** I refer to paper reports
• **And:** I update the database manually
• **And:** I generate and print reports

User Story 6: Donator Website Access
As a food pantry donator, I want to access the food pantry website so that I can contact supervisors.
Feature: Website Contact Info
Scenario: Normal website access
• **Given:** I am a donator
• **When:** I access the food pantry website
• **Then:** I see supervisor contact information
• **And:** I can coordinate my donation
Scenario: Website malfunction
• **Given:** I am a donator
• **When:** The website is not working
• **Then:** A custom error screen displays contact info
• **And:** I can still contact the supervisor.

User Story 7: Customer Website Access
As a customer, I want to access the food pantry website so that I can view the hours.
Feature: Website Hours Info
Scenario: Normal website access
• **Given:** I am a customer
• **When:** I access the food pantry website
• **Then:** I can see the hours of operation
Scenario: Website malfunction
• **Given:** I am a customer
• **When:** The website is not working

• **Then:** A custom error screen displays contact info

• **And:** I can contact the pantry to learn hours

User Story US-8: Low Stock Alert Notification

As the system, I want to notify administrators when stock is low so that inventory can be replenished in time.

Feature: Low Stock Alert

Scenario: Item below threshold

- **Given:** The system is monitoring inventory
- **When:** An item's stock falls below the threshold
- **Then:** An alert is displayed on the administrator dashboard
- **And:** An email notification is sent to the administrator

Scenario: Item above threshold

- **Given:** The system is monitoring inventory
- **When:** An item's stock is above the threshold
- **Then:** No alert is sent

VI. Glossary

Cougar Card: Washington State University's means of identification for students, staff, and faculty.

Entity-Relationship (ER) Diagram: A model that visualizes the structure of a database through defined entity relationships.

Functional Requirements (FR): Capabilities that the system must perform.

Non-Functional Requirements (NFR): Quality attributes that define how the system operates.

Traceability Matrix: A table connecting a system's functional requirements to their corresponding use cases, user stories, and other system elements to ensure project component coverage.

Uptime: The amount of time a system has been operational without unplanned interruptions.

Use Case: A description of how an Actor interacts with a system to achieve specific outcomes or goals.

User Story: A description of a system feature from the perspective of an end-user.

WordPress: An open-source framework for building and publishing websites.

VII. References

[1] United States Government Accountability Office, “Estimated Eligibility and Receipt among Food Insecure College Students,” US Government, Washington D.C., June 2024. Accessed: September 12, 2025. [Online]. Available: https://www.gao.gov/assets/gao-24-107074.pdf