WEB APPLICATION FOR DIGITIZING PASSENGER MANIFESTO: PASSENGER e-MANIFEST SYSTEM

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ABSTRACT. *The traditional passenger manifesto is kept on paper. The records were written using pen, and it took time for shipping companies to send the manifest to their intended monitoring agencies. It was prone to damage or misplacement of records. Passenger e-Manifest System (PEMS) aims to eliminate the manual process of pen and paper procedure of documentation. Digitizing the operation that can streamline data collection and management makes feedback loop and decision-making faster and data-driven. Shipping companies register all their voyage, and their travel schedules are made available online thru the PEMS Web App for all passengers. Maritime Industry Authority (MARINA) takes the lead for the actual implementation of the project to direct shipping companies in compliance with the requirements. The generated passenger manifest was shared with the LGUs, Philippine Ports Authority (PPA), Philippine Coast Guard (PCG), and other Monitoring Agencies for safety protocols and processes. There are fifteen accounts for seven shipping companies, including their sub-accounts/branches, nineteen accounts for Mindanao LGUs, eight accounts for PPA, and two for PCG.*

1. INTRODUCTION

Passenger manifesting governs the counting of all persons carried onboard passenger ships to ensure that all persons on board are duly and adequately recorded. Memorandum Circular No. 180 enhances maritime safety for the protection of life and promotes the convenience of the riding public.

The traditional passenger manifesto follows a pen and paper format filled out by the shipping companies from the ticketing service's gathered personal information. Before the ship leaves the port, the shipping vessel company must submit the Passenger Manifest to the Philippines Port Authority (PPA) for compliance. However, they fail to deliver this requirement due to the schedule of travel and other issues.

Digitalization of the Passenger Manifesting will eliminate the pen and paper procedure of the manual process to submit this required information to Maritime Industry Authority (MARINA). Digitization is the conversion of manual to automated processes. The term 'digitization' refers to creating an electronic replica of a 'real world' object or event that may be saved, shown, and edited on a computer and then spread across networks and/or the World Wide Web [1-8].

Passenger e-Manifest System (PEMS) came up as a solution. The users of this online platform will see the modules for Passengers, LGU & Transport. Each module is designed for its users. The Passenger's module is for passengers to choose for them to comply with the Passenger Manifest MC 180. A passenger will fill out a form as a data collection for LSI/ROF. In the LGU module, the user can be given enough lead time to know the number of returning residents so they can prepare for the transportation and quarantine arrangements, while in the Transport Module, it is designed for the passenger vessel companies to digitize and streamline their documentary compliance for MARINA.

2. Proposed System

Figure 1 shows the framework of the Passenger e-Manifest System. With PEMS, data collection will start from the shipping companies. Passenger information which includes the names of the passengers, travel destination, contact persons, body temperature, and travel history, will be encoded and uploaded into the system. This system will give the LGU's lead time to know the number of returning residents and prepare for transportation and quarantine arrangements. Returning residents will be spared from staying more extended periods at the holding center and lessen the chance of infection to spread.
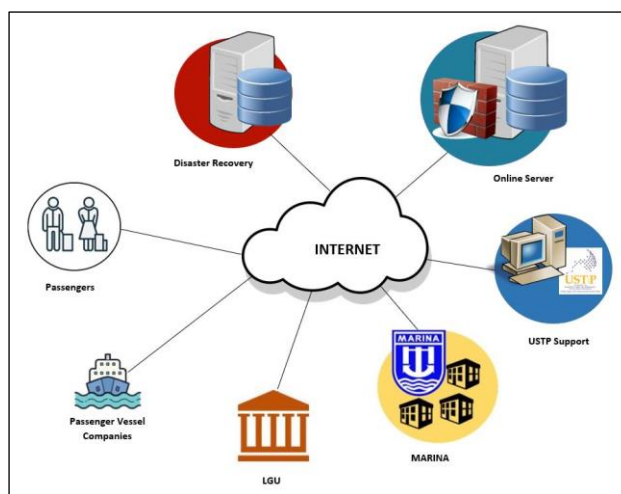

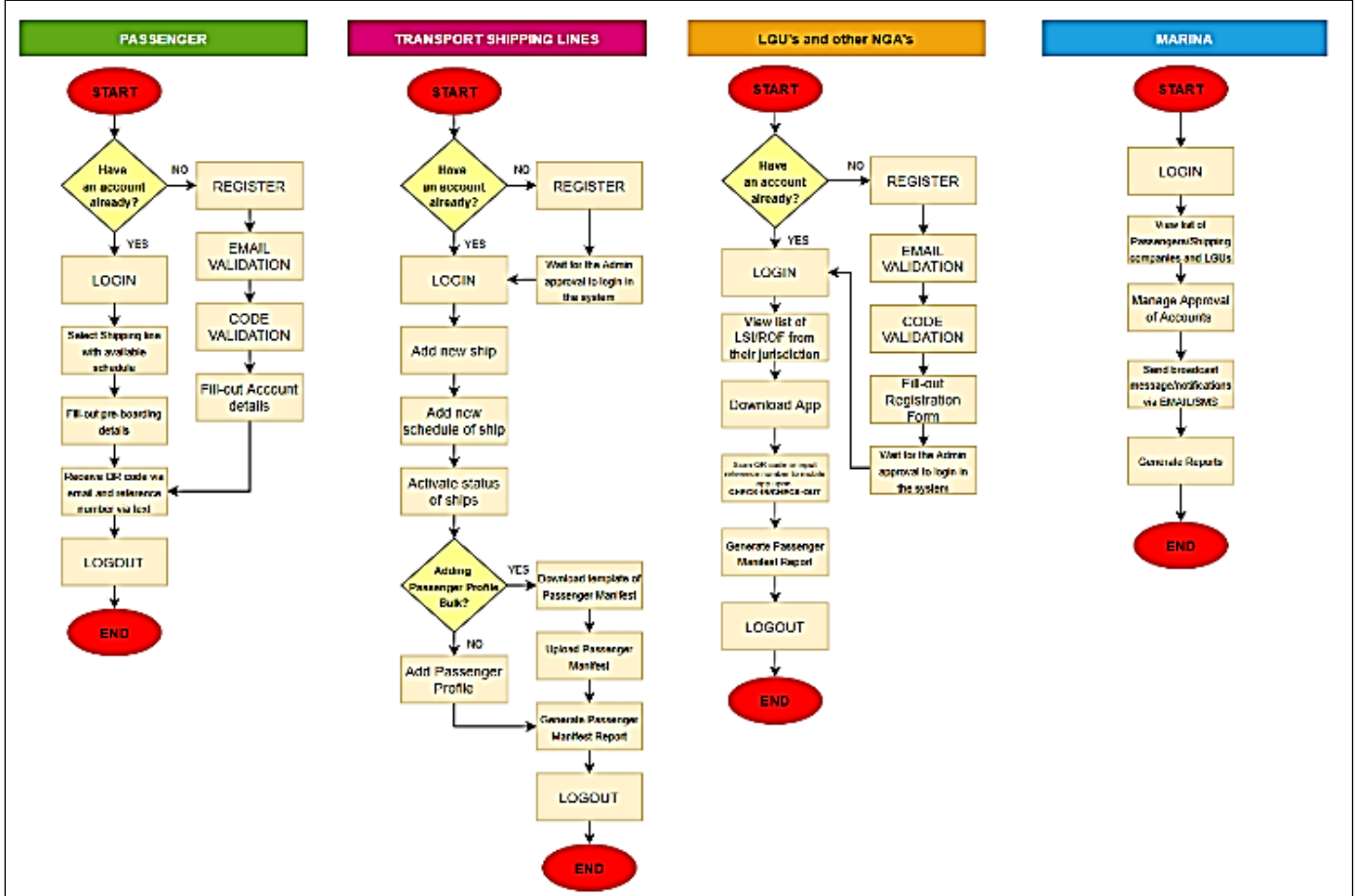**Fig. 1. Conceptual Framework of Passenger e-Manifest System (PeMS)**

Fig. 2. Process Flow of PeMS

There are four primary users of the system: passengers, transport shipping lines, LGU's and other NGA's, and Marina. Figure 2 discusses the step-by-step process flow on how the PEMS works. Under the passenger module, upon registration, the filled-out information will then be used by the system for data collection for Passenger Manifest. Transport Shipping Lines can digitize and streamline their documentary compliance for MARINA. A passenger shipping company will register their ships and add schedules for the voyage. In this manner, the Passenger can book a trip once the vessel and schedule are activated. In the LGUs and NGAs part of the system, it gives enough lead time to know the number of returning residents to prepare for transportation and quarantine arrangements in this time of the pandemic. Lastly, MARINA can have a streamlined tracking and documentation process for the returning seafarers.

2.1 Software Development
The proponents used a process known as incremental development, which is a generic methodology paradigm. This software development process is based on the idea of designing an initial implementation, testing it with users, then iterating through multiple versions until a satisfactory solution is found [9-15]. This approach was chosen because it enabled engineers to find and evaluate all requirements while working on the system. It required cooperation from the production team and the target users, who helped by

pointing out crucial features. Because the system's proponents anticipated changes, the code structures were designed to be adaptive. Even though the method is still in its early stages, it can lead to a more efficient system [16-23].
During the production of each edition, three phases of software development were accomplished simultaneously (Figure 3). The initial edition was the most significant to develop because it served as the foundation. During the specification phase, the proponents interviewed a licensed physician and experienced nurses familiar with the consultation procedure and parameters included in the program. The physician's and nurses' opinions and comments aided in developing a simple system design (Figure 4).
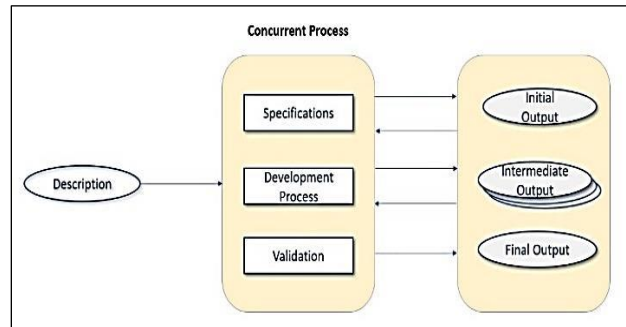

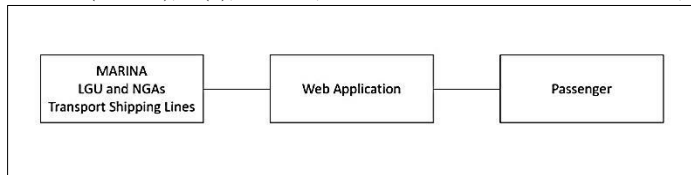**Fig. 3. Incremental development model [9].**

Fig. 4. System Architecture

The proponents decided which programming language, localhost server, and other apps would be required to build a working system. User-friendly, customizable, and capable of serving as a consultation platform were recognized as user criteria. The proponents used HTML, PHP, and ReactJS in the development process and WordPress to make coding easier. After the initial version was established, it was validated by MARINA and Philippine Port Authority (PPA) representative. During the initial validation, the quality analyst of PEMS discovered difficulties such as user log-in, information arrangement, and display error. In the first version that was created, the Passenger's middle name and zip code information are required for the manifest. However, shipping companies suggested that this data be optional because some netizens may not have a middle name, and some passengers didn't provide their zip code information when filling out forms.

All comments and ideas from the shipping companies and MARINA, PPA and Philippine Coast Guard (PCG), and other agencies who verified the first version were considered throughout the specification phase for version 2. Internet articles and research of similar studies also helped find some additional criteria for improving the original version. The initial version was actually enhanced over the development process. Based on the findings of the initial validation, the proponents adjusted the design and added new modules for additional capability. To increase the quality of their reports, the proponents changed their database design. A second validation was performed after the development, which resulted in the discovery of a design defect.

The proponents skipped the specification procedure during the final version's creation because all needs had already been stated. During the development phase, the proponents refined the user interface design and resolved several browser display incompatibilities. After that, a system evaluation survey was used to finalize the system's validation.

2.2 Web-Page Development

The first is designing the front-end user interface to ensure that visitors can easily interact with the page. The developers made a systematic process for the users to register in the PEMS and correlate with the system's entire flow. Passengers can register in the web application through passengertracer.net. A personal email address is required to validate one's identity to have an account. The used email will receive a unique code to be used in the web app to proceed in the next step, filling out personal information. A step-by-step process of registration of PEMS is shown in figure 5.

After the registration process, the Passenger can now choose a shipping line company along with its available schedules on board. Once a ship is being selected among the available schedules, the Passenger is now in pre-board. After clicking **PRE-BOARD**, a pop-up will appear. The Passenger needs to fill out the companion details, nearest

relative, and additional transport information and click

Fig. 5. Registration Process of PeMS

save. In the passenger dashboard My Travels tab, the Passenger's status is still "pre-boarded" it will change to "Boarded" once the Passenger is already on the ship. Passengers can also edit and cancel pre-boarding details. A QR code will be sent to the Passenger's email and reference number via text message. Once received, this data will be used when entering the port for easy access to verify Passenger's identification. Figure 6 shows a step-by-step process of complying with the Passenger Manifest using PeMS.

Fig. 6. Complying with Passenger Manifest in PeMS

2.3 Testing and Evaluation

To make the system more functional and bug-free, the proponents conducted alpha testing. This kind of testing makes the software system more refined before its deployment. Information Technology personnel of the Digital Transformation Office conducted the alpha testing. After fixing some design issues and functionality, users tried the system again and resolved all the loopholes.

The system will not be as reliable as it is if it is not used and tested. USTP-Technical Team conducted a Pilot Implementation of PEMS, a web-based electronic passenger manifesting that provides real-time data sharing between the shipping company, the maritime regulators and enforcers, and the LGU-destination of the Passenger. Together with the help of the Port Management and Maritime Advisory Council (PMMAC) and Port Security Council (PSAC), and Shipping Line Companies. Through this Pilot Testing, hidden bugs and

issues of the system will now be addressed and fixed. During the Pilot Implementation of PEMS, some issues are still being encountered and fixed directly by the PEMS Technical Team. Some of which are the wrong retrieval of records due to the updates and DNS problems with the server. Shipping

Fig 7: Transaction Failed in Updating Shipping Company Profile

companies using PEMS contribute a massive role in determining the system's issues during the Pilot

3. RESULTS AND DISCUSSION

The purpose of PEMS was met through the developed web application. A total of 7 shipping Companies listed and 15 Accounts of Shipping Companies, including their sub-accounts/branches, were created upon the Pilot Implementation (figure 8).

There are twenty-nine (29) accounts created for Agency Module (figure 9), nineteen (19) accounts for coming from different Local Government Unit (LGUs) in Mindanao, two (2) accounts from Philippine Coast Guard (PCG), and eight (8) accounts for the Philippine Ports Authority (PPA PEMS Technical Team of USTP conducted an Orientation and Training with each of the Shipping Line Companies, MARINA, and other related Agencies. Ninety-one (91) participants joined the virtual meeting of the said event. PEMS was discussed thoroughly and shown a live demonstration on how to navigate with the online PEMS Portal. Implementation. Figure 7 shows that a transaction failed when LK Shipping Lines updated their account and then fixed it immediately by the PEMS Technical Team.

Fig. 8. Shipping Companies Active Accounts

Fig. 9. Accounts Created for Monitoring Agencies Associated with PeMS

The PEMS Technical Team conducted orientation and training together with all the shipping companies registered in the system. The event taught them how to add ships details, create schedules, import passenger manifest in a bulk file, and add passenger profiles using the PEMS online portal.

4. CONCLUSION

Shipping Line Companies, MARINA, Philippine Port Authority, Philippine Coast Guard, and other monitoring agencies were so thankful for the evolution of the Passenger Manifesting. It is a must to count and manifest all persons

carried onboard passenger ships to ensure that all persons on board are duly and adequately in record further to enhance maritime safety for the protection of life and promote the convenience of the riding public.

PEMS encounters bugs and process issues with the system, especially in retrieving data during system updates. The USTP Technical Team as the developer of this system resolves these issues and provides easy access for users to comply with the passenger manifest. Online Passenger Manifesting for shipping companies as to compliance for MC 180 indeed provide time-efficient and well-rounded maritime safety.

5. Acknowledgment

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