Flight Information Display System Development Web-Based

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ABSTRACT
Airport services include widespread dissemination of flight information to passengers. The Flight Information Display System (FIDS) is essential, providing passengers with details like flight data, departure gates, destinations, status, directions, origin, estimated gate arrival time, departure and arrival timings, and flight numbers. The purpose of developing this web-based flight information display system is to facilitate passengers in obtaining flight-related information. This application aims to enhance satisfaction, comfort, and accessibility to flight information. The system utilizes sample flight data input by administrators and accessed by passengers via the internet. The design employs UML and development is executed through a CMS. The research methodology employed is Research and Development (R&D), following the Analysis, Design Development, Implementation, and Evaluation (ADDIE) model.

Keywords: Airport Service Management, Flight Information Display System, Web-Based System

1. INTRODUCTION

The Industry 4.0 revolution in Indonesia has implications across various aspects in the country, with one being the airport management system [1]. The enhancement of management systems that are supportive and competitive in this era can streamline operations for operators and enhance services for passengers [2].

One of the primary implementations of information systems at airports is the Flight Information Display System (FIDS). The main function of FIDS is to generate, organize, and display schedule information to service users at the airport. Another objective of utilizing the FIDS device is to enhance communication and ensure that airline passengers receive pertinent information regarding their flight schedules [3].

The data information presented on the FIDS holds significant importance for passengers, providing pivotal flight-related details. Currently, this matter is underpinned by the predicaments encountered by passengers concerning scheduled flight status information. This circumstance arises due to the incapacity of the FIDS to exhibit information on its display, attributed to the inability to transmit data from the server to the FIDS interface [4].

Ensuring the effective functioning and meticulous upkeep of the FIDS is essential for maintaining seamless airport operations. The FIDS serves the purpose of distributing information to travelers, covering check-in statuses and the designated check-in counter positions for individual airlines, along with departure and arrival points [5]. Furthermore, it furnishes particulars concerning flight statuses, gate allocations, flight classifications, estimated departure and arrival durations, as well as the precise departure and arrival moments of airplanes [6].

In the course of its development, the FIDS has been enhanced by incorporating additional information, namely, directions to the assigned gate for passengers, along with the time information required by passengers to reach the gate. This information will be accessible through a web-based interface, designed to serve as a solution in the event of an error occurring in the FIDS display [7]. The research's objective is to enable passengers to access flight status information, aiming to enhance operational efficiency.

The research is founded on Transportation Regulations, which stipulate that the information unit operates within the scope of the Aviation Security and Safety Section, while the Terminal and Public Information Unit plays a crucial role in supporting the flow of airport operational activities and directly engaging with passengers. [8]

Figure 1 The Flight Information Display System is currently inoperable

Kalimarau Airport has multiple flight Information Display Systems that are facing constraints, resulting in the inability to display flight information on the screens. This situation has a significant impact on passenger services, affecting the availability of necessary flight-related information for each passenger and influencing the flow of passengers within the airport.

The research phase or development process requires analysis of research findings for the product to be created, creation of the product based on those findings, field testing of the product according to its usage context, and revision based on field testing findings. [9]

Based on the aforementioned issue, the research will be focused on addressing the problem through the development of a web-based Flight Information Display System at Kalimarau Berau Airport.

2. METHODS

According to [10], Research and Development (R&D) method is defined as a research method used to produce specific products and test the effectiveness of those products.

According to [11], development research aims to assess changes that occur within a specific period of time.

According to [12], research methodology is the primary approach used by researchers to achieve objectives and determine answers to the posed problems.

2.1 Research Design

The ADDIE model remains relevant due to its adaptability and flexibility in addressing a variety of issues. Its effectiveness is widely acknowledged, and the acronym is well-known in the field. The model's structured framework provides a systematic approach for development, with built-in stages for revision and evaluation [13]. These attributes emphasize the enduring value of the ADDIE model, which offers an effective, adaptable, and structured approach to development processes. There are several research designs that consist of Analysis, Design, Development, Implementation, and Evaluation [14]

2.2 Research Methodology

The research conducted by the author utilizes the R&D (Research and Development) method, which is interpreted as development. R&D is a type of research used for the enhancent, design, and evaluation of a pre-existing program [15].

2.3 Research Objects

The design of a web-based information system application with its supportive components in development is the author's final project. The design process involves employing software and hardware as supporting components for creating the web-based application [17]. These components consist of desktop PC hardware and supporting software like XAMPP and CodeIgniter for application development [18].

2.3.1 Application Design

The system to be programmed will be built using the web as its foundation. This development system can be accessed anytime and anywhere, provided there is an internet connection and the necessary hardware support. At the outset of web development, a website mock-up is created to outline passenger flight information in the displayed menu [19]. This mock-up represents a web-based Flight Information Display System (FIDS) from the admin's main page to the data processed by the admin and the main website page.

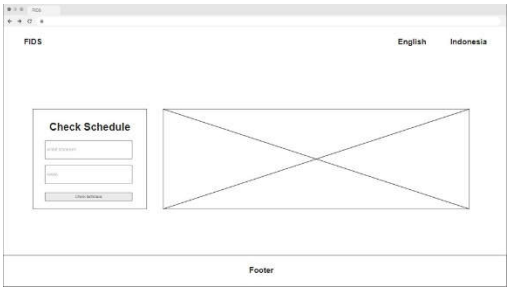


Figure 2 Example Mock-up of the User's Main Web Page

The users, administrators, and service managers involved in the information system are divided into three parts:

a. Admin

The administrator is responsible for managing and designing the information system related to passenger flight statuses on the website. Their tasks include overseeing, entering data obtained from AMC (Apron Movement Control), setting remarks in case of changes, and monitoring all activities on the website for errors.

b. Information Status Service Manager

This role serves as a facilitator of both hardware and software to the admin.

c. Users

These are consumers who utilize the service provided by the flight status information system managed by the information status service manager. The service users in question are passengers. The following outlines the flow of incoming and outgoing data and its relation to the aforementioned three parties.

d. Inbound Data Flow:

- The admin plays a role in inputting passenger flight data.
- The flight information service manager acts as a provider of facilities for the admin's information needs.
- Service users or passengers provide information about flight and passenger data

e. Outbound Data Flow:

- The admin's role involves receiving and storing passenger flight data. The information from this data is intended for identifying passenger flight status information.
- The flight information service manager's task is to serve passenger flight status information. They provide flight-related information to the admin.
- Service users receive flight status information on the provided information service website.

2.3.2 Application Development Components

The author utilized a Content Management System (CMS) in their final project research, as it facilitates the process of creating a website. This is based on the premise that utilizing a CMS does not require proficiency in programming languages. When it comes to website management, the author can easily modify themes to align with their desired design. The flowchart diagram was prepared in a comprehensive manner prior to implementation, and it was developed using the Codeigniter Framework as the platform.

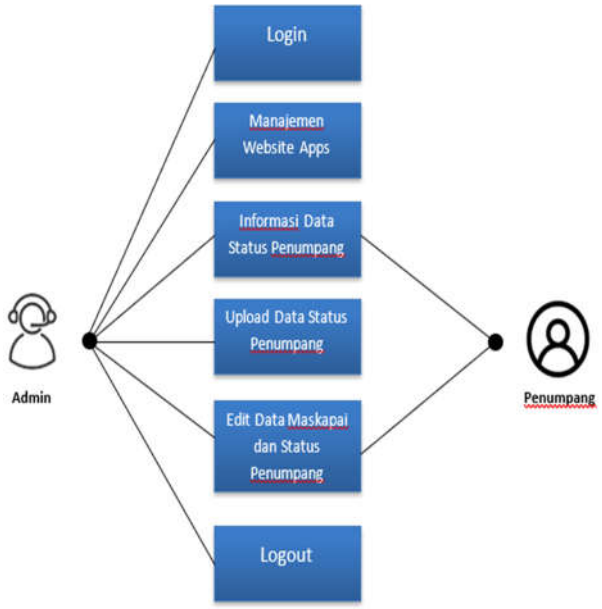


Figure 3 Use Case Diagram

From the above description, in the web-based system application design, the following components are utilized:

a. XAMPP Working Concept

XAMPP is an auxiliary development tool for open-source software packages that support a wide range of operations. It functions as a local server for storing website databases [20]. In this research, XAMPP is employed as a component to display all website content created offline due to its Cross-platform functionality. This capability facilitates the transition from local server testing to online server deployment.

b. Content Management System (CMS) Working Concept

In this final project, the author employs a Content Management System as a means of creating the information system application to determine passenger flight statuses. Using CMS simplifies the process of website development, eliminating the need for proficiency in programming languages. This is advantageous for modifying themes according to desired preferences. A pre-designed flowchart diagram is then implemented and developed using the Codeigniter Framework as the platform.

2.4 Time and Location

The research planning was carried out from January 2023 to February 2023, with the design and research conducted in the city of Berau. The application development will take place from May 2023 to July 2023, with the research location in the city of Surabaya.

3. RESULT AND DISCUSSION

3.1 Analysis

In this phase of analysis, the author gained insights and contributed to decision-making regarding solutions to the existing issues with the flight information display system server. The approach involved converting the flight information display system into a web-based platform, allowing the information stored on the server to be seamlessly integrated into a website.

This modification facilitates passengers' access to essential flight details. Implementing this change requires the provision of necessary hardware as the core infrastructure and software components to support the hardware's functionality. The development efforts for this updated flight information display system also involve designated personnel responsible for inputting the daily flight schedule information. This ensures that passengers can easily access up-to-date information, ultimately streamlining the airport staff's management of flight information services.

Based on the analysis conducted by the author, there is currently no facility available for passengers to view

and access the web-based Flight Information Display System on their individual devices, especially in cases where there are issues with the flight information display system server. In this context, there is an opportunity for development that focuses on the Flight Information Display System. This opportunity lies in constructing a web-based application for the Flight Information Display System. Such a system application has the potential to be well-received by the public if implemented within the Indonesian aviation industry.

This Flight Information Display System application can be developed with a cost production rate that is not excessively high. Moreover, it aligns well with the trend of increasingly sophisticated gadgets and the growing usage of such gadgets among the general public.

3.2 Design

The flight information display system is a dynamic and advanced system used to control flight information on monitor screens and public display facilities disseminated within airports. The development involves two primary design aspects are data design and system design.

In the data design, modifications are made to transform the flight information display system with a server into a web-based flight information display system, addressing the current server-related challenges. Subsequently, in the system design, changes are introduced to the system architecture, particularly in the form of hardware. This hardware functions as the server for the web-based flight information display system development.

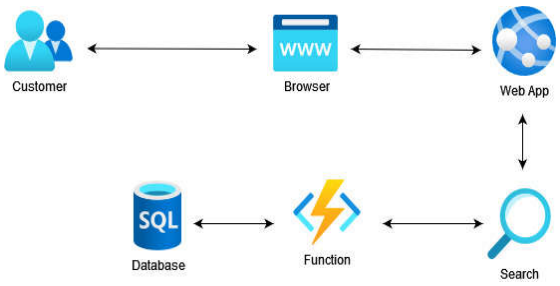


Figure 4 Flowchart of System Design Flight Information Display System Web

The flowchart above illustrates the design process undertaken for the development of the flight information display system, enabling online access through each passenger's respective browser by navigating to the website page myfids-iim.com.

The design of the flight information display system application on the server has been enhanced to enable access through a website interface. The main menu of the website presents the following options:

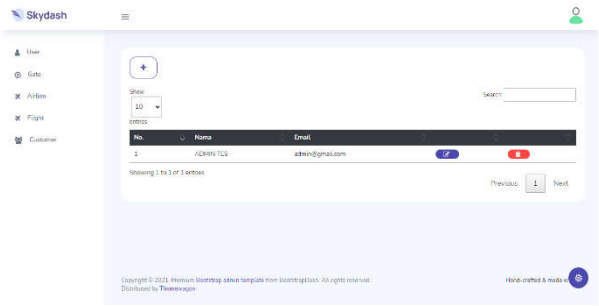


Figure 5 Web Design of Flight Information Display System

The architectural design of the web-based Flight Information Display System (FIDS) server generally comprises an application server equipped with database tools and applications such as XAMPP, Visual Studio Code, and CodeIgniter. This FIDS application is accessible to air passengers through the internet on their personal devices. The following depicts the visual representation of the architectural development of the web-based FIDS:

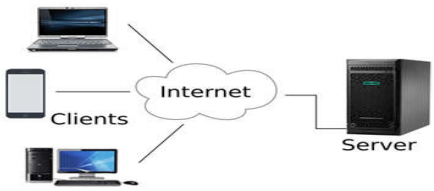


Figure 6 The architecture design of the Flight Information Display System

In this phase, the design outcomes will illustrate the flowchart of the data input process, the flowchart of the FIDS information access process, as well as images of the application system design and the architectural interface design in the development of the web-based Flight Information Display System.

3.3 Developmet

The development carried out in this application utilizes a Content Management System (CMS) to facilitate its operation, enabling easy access that can be done anytime and anywhere. During the application development phase, the author creates an application as a facility for the Flight Information Display System in passenger flight status services. The development involves adding features to the application and refining it to enhance its execution and usability, ensuring its effectiveness according to the future needs of the aviation industry in Indonesia.

Figure 7 Development Flowchart

3.4 Implementation

During the implementation phase, the author applied the outcomes from the previous stages to transform the server system into hosting and convert the wireframe into a website. This process involved incorporating graphic elements like color schemes, animations, buttons, menus, and several other features. The web-based Flight Information Display System can be accessed by air passengers online through their devices' browsers, visiting the website myfids-iim.com.

3.5 Evaluation

Testing the website system entails the process of running the software system to ensure the compatibility of the developed application with the initial design, as deemed appropriate by the researcher.

3.5.1 Evaluation of Application

a. User Interface of Admin

1. Login Page

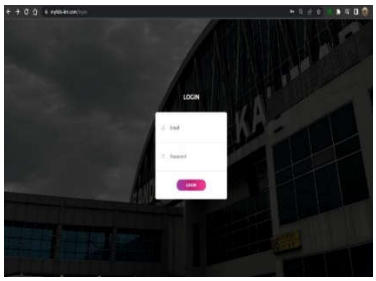


Figure 8 Login Page

The login page or initial page displays a form for the admin to log in. Based on the above testing, it can be concluded that the data input process has been successful, indicated by successfully entering the booking code and passenger name. In this context, the system effectively displays passenger status information from the provided data.

2. Dashboard

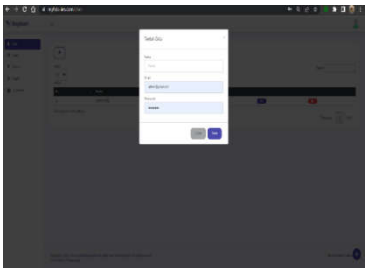


Figure 9 Dashboard of Admin

Testing on the admin user interface post-login reveals that in case of adding or modifying admin data, changes can be made by navigating to the "Add Data" page. The testing process proceeded smoothly, successfully displaying the required data for adding admin information.

3. Dashboard Gate

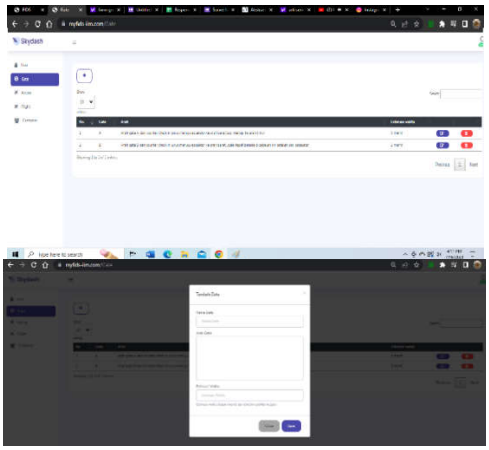
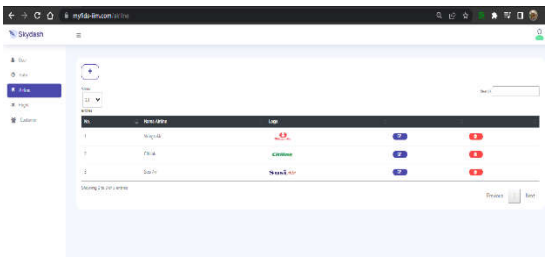


Figure 10 Dashboard Gate

The testing of the Flight Information Display System website on this page has been conducted, specifically focusing on the process of adding gates. The results indicate that the developed system functions in accordance with the intended conditions and automatically records the data. As a result, when passengers access the website, they will receive accurate flight information.

4. Dashboard Airline



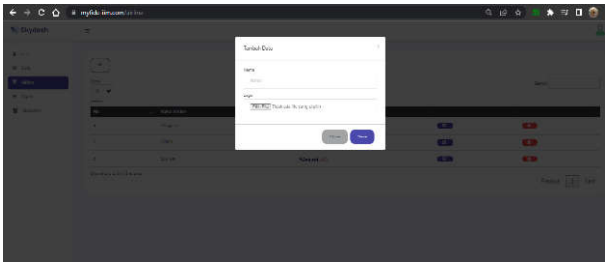


Figure 11 Dashboard Airline

The testing table for adding airline data on the Flight Information Display System website is used to verify the accuracy of the information regarding the addition of airline data, which includes opening and closing routes to and from Kalimarau Berau Airport.

5. Dashboard of Flight Data

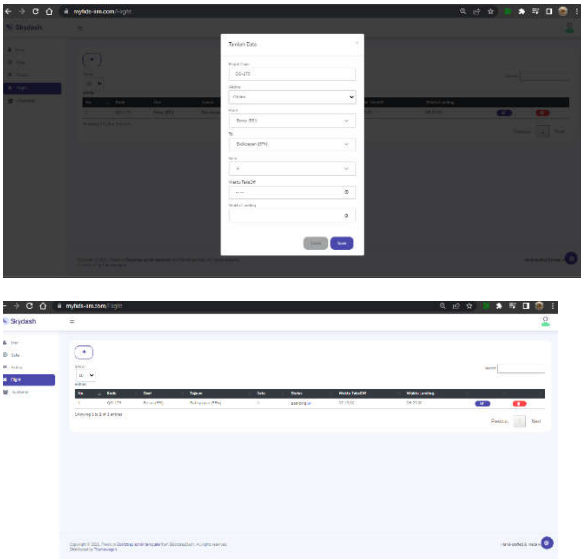


Figure 12 Dashboard of Flight Data

The testing table for adding flight data on this web-based Flight Information Display System is used to input and validate the data provided by the airline.

6. Dashboard of Customer Admin

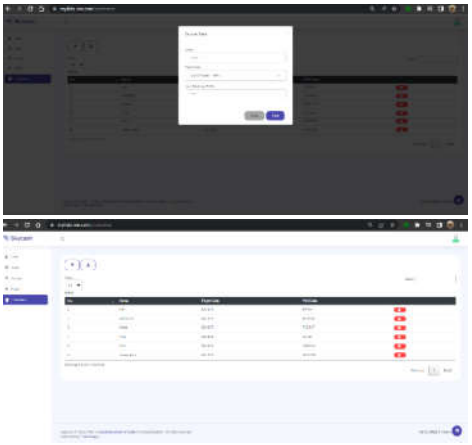


Figure 13 Dashboard Airline

On this page, testing was conducted for customer data input by comparing the data and observing indications that the developed system operates in accordance with the intended conditions. It automatically records the data so that when passengers access the website, they will receive flight information.

7. Acces of Website Adress

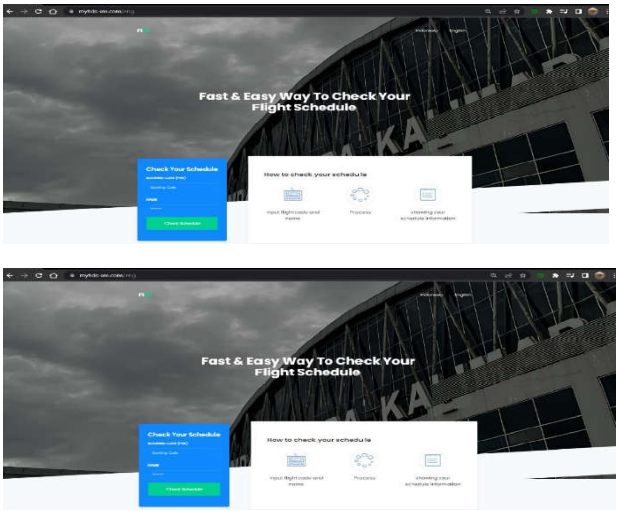


Figure 14 Acces of Website Adress

Testing the access to the website address with the domain myfids-iim.com for passengers and myfids-iim.com/login for admins was carried out to verify the connection between the website address and the web-based Flight Information Display System (FIDS) that was developed. Upon the successful completion of the web-based Flight Information Display System, the data transition from the server is transferred to the hosting and uploaded from the local server to the online server. Therefore, the website must have a domain or URL address to be accessible by air passengers. On this website, passengers are expected to access it and choose a language that is understandable to them, such as Indonesian and English.

b. User Interface of Passanger

1. Passanger Login Page

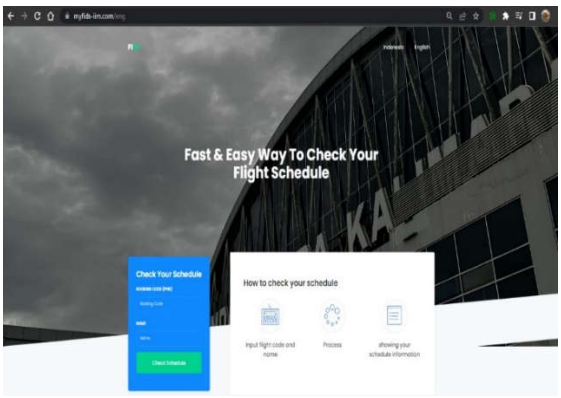


Figure 15 Passanger Login Page

The testing of the passenger's login page in this phase involves entering the booking code and passenger's name on this page. As a result, the passenger will be directed to the next page, which contains information related to their flight.

2. Passanger Information

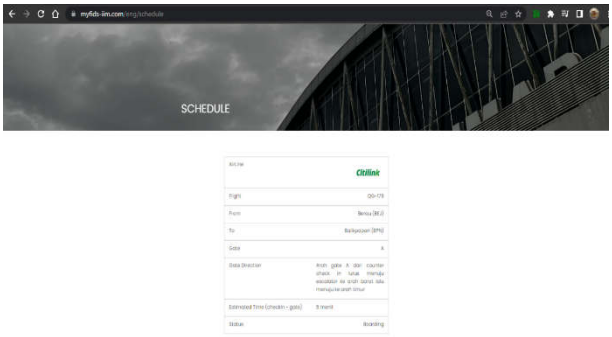


Figure 16 Information of Passanger

The testing on this page is a result of the previous phase, where after entering the booking code and passenger's name, this page will display the passenger's status information. Additionally, there are added features such as directions to the gate and estimated time to reach the gate. The conducted testing revealed no issues with the flight information display system website.

4. CONCLUSION

The proposed Flight Information Display System in this writing includes additional enhancements, such as information about gate directions, estimated time to reach the intended gate, accessible through a website. In this context, the development conducted can have a positive impact on both passenger services and airport personnel in their tasks.

This positive impact facilitates passengers in obtaining flight information by accessing it through the website myfids-iim.com on the browser of their devices. Another positive effect is that it eases the work of airport staff in case of disruptions to the FIDS system displayed on monitors at various terminal and gate points. This way, passengers can receive necessary flight information without direct contact, accessing the provided website..

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