ELECTRONIC AIR TRAFFIC SERVICE (ATS) ROUTE AS A SUPPORT OF EN-ROUTE FLIGHT INFORMATION (EFI) AND FLIGHT PLAN LEARNING FOR AVIATION SAFETY CADETS AT AVIATION POLYTECHNIC OF SURABAYA

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Abstract
ATS Route is a certain route designed to channel the traffic flow required for the provision of air traffic services. ATS Route Electronic Website, a product created to support aviation safety cadets practice on flight routes. The ATS Route Electronic product only displays domestic routes within Indonesia. In this research method used in analysing the writing data of this final project is the quantitative R&D method, a research whose analysis results are presented in the form of numbers which are then explained and interpreted in the form of descriptions. This product has received validation from experts and respondents from the research sample. As well as getting product trial results with a good value index. The results of the calculation of 92% state that the website product is suitable for use, while 8% there are still deficiencies that can be developed again.

Keywords: *ATS Route; website; domestic route; En-Route Flight Information; Flight Plan Learning.*

INTRODUCTION

The learning aviation safety cadets, especially about ATS Route. Cadets experience a lack of media and facilities in supporting the practice of En-route Flight Information (EFI) and flight plan material. to overcome this problem, the author conducted a research that produced an electronic ATS Route website product. The benefits and objectives of this research are to design a electronic ATS Route website-based as a cadet in polytechnic aviation of Surabaya learning support facility.

ATS Route is a specific route intended to channel traffic flows necessary for the provision of air traffic services. The term "ATS route" refers to a variety of airways, including jet routes, area navigation routes (RNAV), and arrival and departure routes. [1] An ATS route is defined by route specifications which include an ATS route designator, the track to or from significant points (waypoints), distance between significant points, reporting requirements and, as determined by the appropriate ATS authority, the lowest safe altitude. [2] To get valid data, input of flight route data created in the website product is taken from the AIP Vol.1 document. [3] Electronic ATS Route is an electronic device used for

flight crews that is enabled to carry out continuous aircraft monitoring, in a convenient and timely manner, route planning, route monitoring and navigation by electronically displaying the required information. [4] A website is an internet facility that connects documents locally and remotely. Documents on the website are called webpages and links on the website can be used by users to switch from one page to another (hypertext) page either between pages stored on the same server or on servers around the world. Pages can be accessed or read through browsers such as Google Chrome, Mozilla Firefox and so on. [5] A website is a collection of interconnected web pages and all files are interrelated. The web consists of pages and a collection of pages called the homepage. The homepage is at the top position with related pages below it. Usually, each page below the homepage (child page) contains hyperlinks to other pages on the web. [6] [7] [8] [9] [10] The website used in this product is intranet-based, whose use is not limited but can only be done using a local network at the Polytechnic Aviation Of Surabaya. Intranet is a corporate or government network that uses tools on the internet, for example, such as web browsers and internet protocols, where the intranet network here will be used by the company or government as a medium of communication

and collaboration. [11] [12] Another term is a Local Area Network (LAN) that uses communication standards as well as all the facilities of the Internet, likened to having the Internet in a local environment. [13]

Electronics is the science and technology of the passage of electrically charged particles in a gas or a vacuum or a semiconductor. [14]. Electronics is the science that studies the properties and use of devices whose working principle is the flow of electrons in a vacuum or gas and the flow of electrons in a semiconductor. [15].

This website is designed to support the learning of efi and fpl material. then the website is made in accordance with the curriculum guidelines and syllabus in the aviation safety study program. The curriculum is a planned learning space, and is given directly to students by educational institutions, which can be enjoyed according to its application. [16] [17] In addition to the curriculum, this product is also based on the syllabus. A syllabus is an outline, summary, abstract, or main points of the content or learning material. [18] [19] Localhost Using the Surabaya Aviation Polytechnic network. This study explains how to design a website and cadets understanding of the E-Location Indicator website. To fulfill the objectives of this study, the following questions were asked:

1. How to design Electronic ATS Route based on Intranet as a support learning En-route Flight Information (EFI) flight plan at Aviation Polytechnic of Surabaya ?

METHODS

Research and Development (R&D)

Research and Development (R&D) are steps in the context of developing a new product or perfecting an existing product so that it can be accounted for.. [20] The purpose of development research methods is to produce new product designs, test the effectiveness of these products, it is necessary to conduct research to test the effectiveness of these products. This development research is guided by the research design for the development of instructional teaching materials by Dick and Carry. ADDIE as the name implies is a model that involves the stages of model development with five steps/phases of development including: Analysis, Design, Development or Production, Implementation or Delivery and Evaluations). The ADDIE model was developed by Dick and Carry in 1996 to design learning systems. [21]

The stages that must be carried out in the ADDIE model are as follows. In the first stage, namely the Analysis stage, information will be searched regarding the condition of the cadets and lecturers who will be the research sample. In order to obtain this information, observations and interviews will be carried out. to cadets and lecturers on the appropriate ATS Route electronic website.

The second is the design stage, at this stage several aspects of planning will be carried out. Starting from compiling indicators and goals for making products, as well as designing concepts from product designs that are in accordance with the media to be developed.

The third is the Development stage, at this stage the initial product of the appropriate ATS Route electronic website will be made. Products are compiled by utilizing several software and hardware devices as well as databases. This initial product will then be validated by technologists. The purpose of validation is to obtain expert input and justification regarding the function and workings of the product.

Then proceed with the testing/implementation stage, this stage is the limited trial stage. Revision I Products will be applied to the ATS Route electronic website. This process involves cadets and experts. Expert and cadet responses will be obtained through interview techniques and direct questionnaires to determine the feasibility of using the ATS Route electronic website. Then Revision II will be carried out by samples from the study.

The last step is Evaluation, this stage is the stage of improving the Revised Product based on the responses and input from lecturers and cadets in the fourth step.
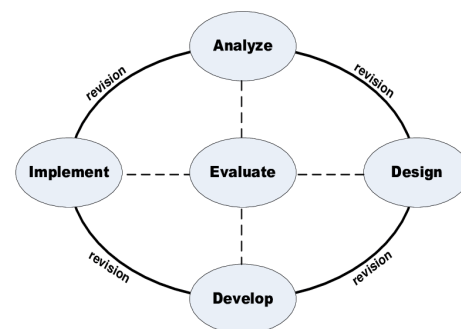

Figure 1 *R&D Research Methods Flowchart (ADDIE)*

Source: Albet Maydiantoro Article

Website Design

This website design aims to design and create an electronic ATS Route that is acceptable to users and easy to use. Electronic ATS Route that can be accepted by users and is easy to use and is adapted to user needs. The website display includes an En-Route chart map of Indonesia, especially domestic routes and points domestic routes and points, a route search column on the right side of the website window, and a tracking highlight after a search tracking highlights after searching.
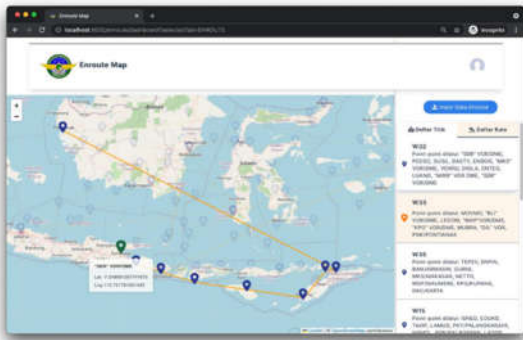
Figure 2 *Design Display of Elektronik ATS Route*
Source: Processed by the Author (2023)

The picture above is the design of the website that will be created. Where there are menus and descriptions of the ATS Route electronic website display later. When entering the web there is an En-Route Chart display, domestic routes and some points, as well as a search route menu, some points, as well as the search route menu.

Participants

This study used a population with three expert validations consisting of two flight plan material expert validations and one media expert and product trials were conducted with 23 cadets and 4 validator D3 Aeronautical Communication batch 6.

Data Collection Technique

To get accurate data in this writing, the author using observation. Observation is the observation and recording of systematic phenomena investigated.

Data Analysis Technique

Quantitative method with the application of R & D is a research method that based on positive philosophy, used to research on certain populations or samples, data collection using research instruments, data analysis, and data collection, certain samples, data collection using research instruments, data analysis is quantitative / statistical. **[22]** The data results were then analyzed using a Likert scale. Definition Likert to can be used as a measuring tool for attitudes, perceptions, individual income and also group income regarding a social phenomenon. The formula for the Likert scale is described as follows:

$$P\ (\%) = \frac{f}{N} \times 100$$

Remarks:

P = Presentation Number

f = frequency that is being searched for the percentage

N = Total score of each

After calculating the average scores then proceed to calculate the percentage results using the following formula. In order to find out the criteria for the percentage results, the Likert scale criteria are used as follows:

Singkatan	Arti	Skor
SS	Sangat Setuju	5
S	Setuju	4
RG	Ragu-Ragu	3
TS	Tidak Setuju	2
STS	Sangat Tidak Setuju	1

Figure 3 *Likert Scale Index Example*
Source: Rezeki Barokah (2021)

Type Of Research

This type of research is a type of ADDIE development R&D research model with a quantitative method which will describe data through simple and relative (percentage) tables and is a form of survey research. And if viewed from the point of view of the place, then this type of research is the type of research that means that the data that has been collected will be analyzed quantitatively.

RESULTS AND DISCUSSION

Research and Development method of development ADDIE model (Analysis, Design, Development, Implementation, Evaluation) which aims to design and build the aims to design and build the ATS Route Electronic website Design:

1. Analysis

From the results of direct observations/observations made by the author, the writer saw that there were several conditions that supported the writer to make this product. Observations themselves were made by the author through personal observation and observation of the informants, namely fellow cadets of the Aviation Communication Study Program batch 6 directly during En-route Flight Information (EFI) learning in semester 4 and Flight Plan learning in semester 2. This learning conducted offline in class or online learning through Zoom Meeting or Google Meeting media. Based on the observations of the informants, the authors conducted interviews with fellow aviation communications cadets, interviews were conducted via electronic media so that they could be taken as evidence, two of them were Gerin Olivia Azahra cadets and Jerlina Wardhani cadets. There are two questions asked namely.

1. What is your opinion regarding the practice of learning En-route Flight Information and flight plans while carrying out education at the Surabaya Poltekbang?

2. Is there a need for media to support the learning practices of these two materials?

From the results of the interviews there were 3 facts obtained

1. Learning for the En-route Flight Information (EFI) course that has been carried out so far, both online and offline, the lecturer only explained in theory and practice which only focused on phraselogy, planning ahead and how cadets in dealing with emergency situations. Without cadets paying attention to where the position of an aircraft is in an air space.

2. Flight Plan learning which is carried out in semester 2 of the KP study program, namely practice in completing the Flight Plan. Cadets are only taught how to fill out a flight plan. Without explaining how the flight route provisions must be used in the flight plan. As technology develops, cadets feel that carrying the ATS Route manually is very impractical and lacks innovation.

3. There is no media that can be used by lecturers and cadets in supporting the learning of En-route Flight Information (EFI) and Flight Plan courses.

2. Design

The design of the ATS Route Electronic Website as a learning support En-route Flight Information (EFI) and Flight Plan material, As has been described in Chapter III will produce a dynamic website that can be used in supporting learning and practice can be used in supporting learning and practice. how the website works is the user starts by opening the website address, then login to the ATS Route website by filling in the user and password. It will automatically enter the ATS Route website window which displays the En-Route Chart, domestic routes, and points used as learning. The software that plays a role in making the ATS Route website is Visual Studio Code, which is software that helps authors run systems and websites that use the Node.js database.

2. Development

Produce a dynamic website that can be used in daily learning activities of aviation safety cadets at the Polytechnic Aviation of Surabaya. The use of this website can only be done at Polytechnic Aviation of Surabaya, based on localhost intranet.
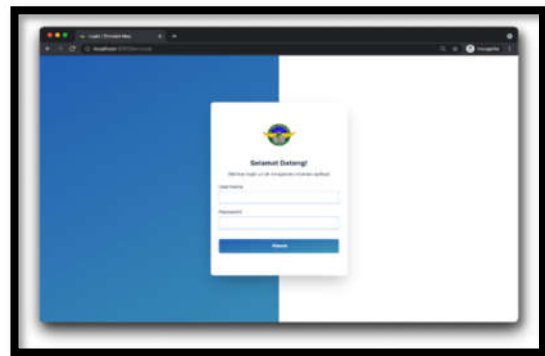

Figure 4 *Login Page of Website*
Source: Processed by the Author (2023)

The first page that appears when the Url is accessed is the Login page. This Login page is designed using the Node.js programming language and Javascript. After logging in, the user will be taken to the main page of the website.
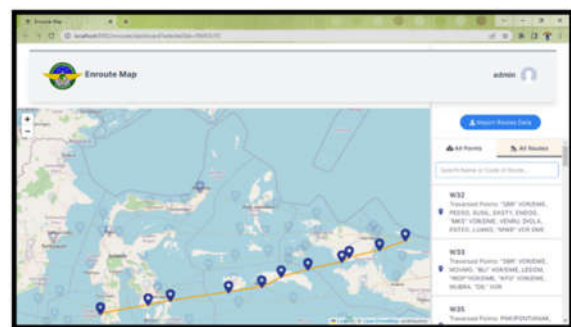

Figure 5 *Display Main Page of Website*
Source: Processed by the Author (2023)

The ATS Route electronic website, created on a localhost basis, means that this website can only be used on the same network as the website admin, this website cannot be used outside the Surabaya Aviation

Polytechnic. To start accessing this website, the user must ensure that the Admin is active. Following are some of the applications used to support website access on Admin devices is Visual Studio Code, Node.JS, GIT SCM, MongoDB.

3. Implementation

In order for the website product produced to be of high quality and valid enough to be used, it requires a product trial. used, it requires a product trial. Implementation of revision testing revision testing implementation was first carried out by direct exposure and testing on experts in order to get validation of product feasibility for use respondent. The results of the tests carried, have obtained satisfactory and successful results in each of the trials. Includes a number of things, namely validation of valid material, a very understandable website appearance and recommendations for proper use with revisions according to suggestions. After getting an assessment from the product trial, the website can immediately be used by aviation safety cadets.

4. Evaluation

The overall calculation is made from all the questionnaire results in the table above, that this product gets a score with an index that reaches 92%. It is stated that the Electronic Website ATS Route product is very agreeable, good and feasible to use for aviation safety cadets at the Polytechnic Aviation of Surabaya. Then there is 8% of the remaining achievement of the value of the results questionnaire results and it was concluded that these results stated that there were still shortcomings in this product that needed to be developed again. The ATS Route electronic website, created on a localhost basis, means that this website can only be used on the same network as the website admin, this website cannot be used outside the Surabaya Aviation Polytechnic. To start accessing this website, the user must ensure that the Admin is active. Following are some of the applications used to support website access on Admin devices is Visual Studio Code, Node.JS, GIT SCM, MongoDB.

CONCLUSION

The research, an electronic ATS Route website design was produced. which is used to assist or support the learning of cadets in the En-route Flight Information (EFI) and Flight Plan practice material. This Electronic ATS Route website carries the characteristics of an intranet-based En-route chart learning facility based on intranet, in which there is an Enroute chart display of the map of Indonesia, domestic flight routes and waypoints. The overall calculation is made from all the questionnaire results

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