

# *Design Of VFR Route Kendari Control Zone For Airplanes Flying To The Bombana Area*

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**Abstract**— Haluoleo Kendari Airport serves local flight traffic, domestic and overflying traffic that passes through Kendari's airspace. Based on the data collected, it is known that Visual Flight Rules (VFR) flights from Haluoleo Kendari Airport to the Bombana region or vice versa do not have a VFR Route so that planes flying VFR fly direct routes. The research method used was Research and Development. Data collection techniques used were interviews and documentation studies. Meanwhile, data processing techniques use data reduction, data presentation, and verification. The author designed the VFR Route using the Commercial Off The Shelf (COTS) Software method. The suggestion that the author can give is for Perum Lembaga Penyelenggara Pelayanan Navigasi Penerbangan (LPPNPI) Kendari Branch to initiate Perum LPPNPI Headquarters for the creation of a VFR Route in the Kendari Control Zone that connects Haluoleo Kendari Airport to the Bombana area, so that air traffic services at Perum LPPNPI Kendari Branch are more optimal.

**Keywords**— flight procedure design, VFR Route, visual flight rules, Kendari

## I. INTRODUCTION

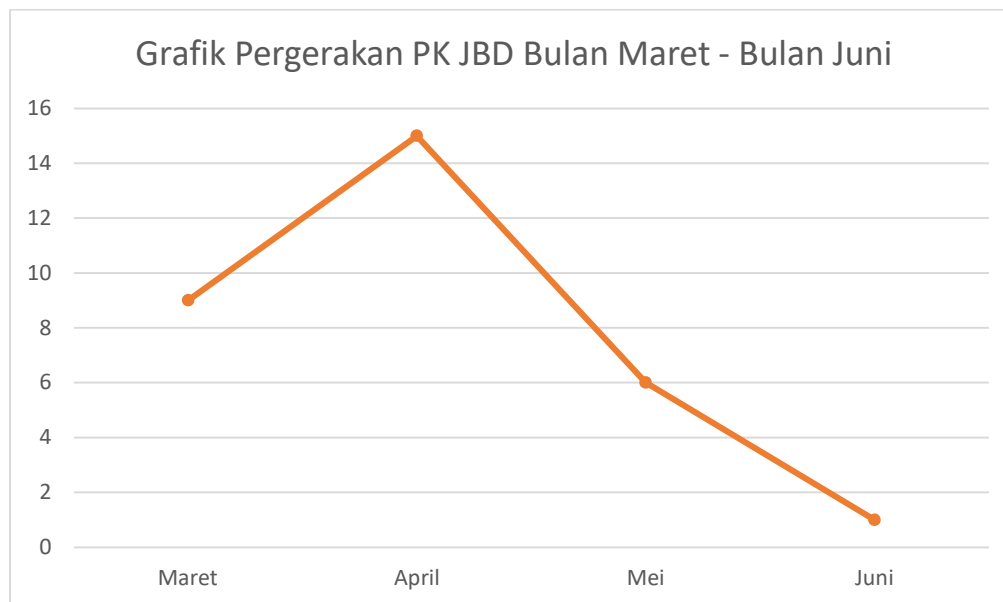
VFR flights (Visual flight rules) is a flight conducted in accordance with the visual flight rules [1]. Visual flight rules are symbols used to show visual flight rules [2]. VFR route is a dividing route between VFR flights with Instrument Flight Rules (IFR) departures and arrivals [3]. Regulation of the Director General of Civil Aviation No. 151 of 2016 explains that flight information services provided for VFR flights must provide information regarding weather and traffic conditions along the flight path [4]. With VFR, Pilots must be able to operate the aircraft both with visual reference to ground, and visually avoid obstacles, and other aircraft using sight, brain, knowledge, experience and training to reduce the risk of collision and in the event of accidental entry into a situation unsafe meteorology [5].

If the density of air traffic and weather conditions guarantees the provision of a tighter ATS, then VFR flights must be separated from the arrival and departure of IFR flights. Consideration should be given to presenting VFR corridors and/or VFR routes, entry and exit points and aircraft anchorage points. An introduction to VFR corridors and/or VFR routes, entry and exit points and aircraft holding points should be considered [3]. Although the level of experience is not an indicator of differences in performance in VFR flights, the ability to gather information, one of which is related to the routes used in VFR, is carried out by pilots with different results. Experienced pilots have far more capabilities than novices [6]. At the time of establishing a flight path, airspace protection must be provided along the flight path and a safe distance from other flight paths in accordance with applicable regulations [7].

Haluoleo Kendari Airport serves IFR (Instrument Flight Rules) and VFR (Visual Flight Rules) flights. IFR flight route is a flight route for IFR aircraft departing from Haluoleo Airport to the destination airport which uses the ATS route or from the departure airport which will land at Haluoleo Airport which also uses the ATS route. Where there are two ATS routes in the Kendari air space, namely W54 and W41.

The Robinson R66 type helicopter with PK JBD registration is a type of rotary wing aircraft that flies on VFR basis from Haluoleo Airport to the Bombana area or vice versa which in one month can make up to fifteen flights at an altitude of 2000 feet. However, VFR flight routes to the Bombana area or vice versa still do not have ATS route guidelines that must be passed by aircraft

Table 1. Graph of PK JBD Movement at Haluoleo Airport



Based on the above, the services provided by the Air Traffic Controller to aircraft are less than optimal and less efficient so that they can cause a hazard. In providing air traffic guidance, an Air Traffic Controller is required to ensure safety, regularity and smooth flow of arriving and departing air traffic (efficiency). In accordance with what is stated in [8] Annex 11 Air Traffic Services Chapter 2, Point 2.2 regarding the Five Objectives of Air Traffic Services, then to ensure safety and improve air traffic services and avoid hazards that will cause collisions between aircraft, the author feels the need VFR Route for visual aircraft to determine the position of the aircraft from a predetermined significant point, this is necessary for optimal air traffic services and preventing hazards. As stated in the International Civil Aviation Organization (ICAO) Doc. 9426 Air Traffic Service Planning Manual Part II Chapter 2 ATS Route Point 2.2.3 which explains that an introduction to VFR corridors and/or VFR routes, entry and exit points and aircraft holding points should be considered.

## II. LITERATURE REVIEW

In the City of Seoul, South Korea and its surroundings, VFR (visual flight rule) routes have been established for visual flights by helicopters and general aviation aircraft such as the Cessna 172S. This flight route allows for safe flight operations by avoiding ground obstructions and specific airspace. Each flight route has visual reporting points, and pilots are required to report every time they pass these points while they are flying along these routes [9]. When flying in VFR, the pilot must maintain constant visual contact with his flight path, constantly checking the aircraft's actual position and speed. When flying in VFR, it is customary to use geographic references described in the course as flyover points; this is an en-route point that must be devolved before changing direction to the next waypoint [10]. Currently, the VFR route is designed in such a way that ATC does not have to worry about directing IFR aircraft away from the VFR route, because the VFR route is not placed near the instrument aircraft procedure [5].

### III. RESEARCH METHOD

The research method is a scientific system for obtaining data with specific purposes and benefits [11]. In this study, the authors applied a Research and Development (R&D) research method with a qualitative approach and descriptive presentation. Data was taken using the results of observations and interviews.

Interview is a data collection technique by asking questions directly to the respondent, then the respondent's answers are recorded [12]. Observation as a data collection technique has more specific characteristics when compared to interviews. If interviews always interact with people, while observations are not limited to people, but to other natural objects, work processes, human behavior [13].

### IV. ANALYSIS AND DISCUSSION

Based on the results of observations and interviews, the current obstacle is if there are rotary wing aircraft flying VFR from Haluoleo Airport to the Bombana area or vice versa, they will fly directly (direct), which can reach fifteen flights in one month. However, VFR flight routes to the Bombana area or vice versa still do not have ATS route guidelines that must be passed by aircraft.

There are two places the helicopter is aiming at when it flies to the bombana area, namely the sugar factory and the port of Paria. In accordance with [14] "KDI" VOR/DME is at coordinates  $04^{\circ}04'32.6''\text{S}$   $122^{\circ}27'10.2''\text{E}$ . The sugar factory is at coordinates  $4^{\circ}34'50.43''\text{S}$   $121^{\circ}52'51.66''\text{E}$ , while the port of Paria is at coordinates  $4^{\circ}47'29.79''\text{S}$   $121^{\circ}37'39.31''\text{E}$ .



Figure 1. Coordinates of the Sugar Factory

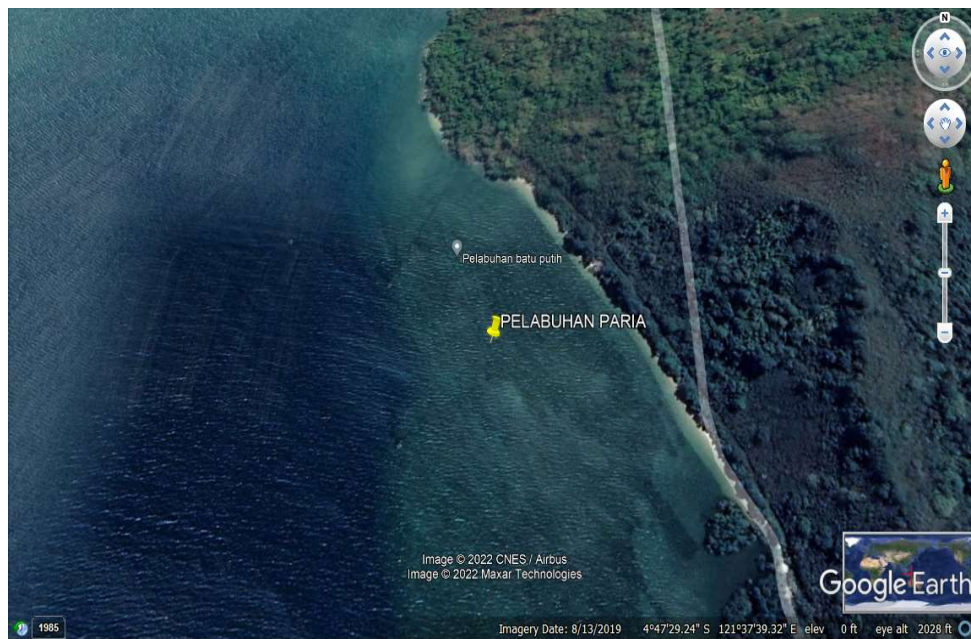


Figure 2. Coordinates of Paria Port

Flight information services provided to aircraft must include information regarding traffic information, weather conditions, and other information for flight safety. An ATC is required to know the position of the aircraft and convey the required flight information. The aircraft is also required to report the position to the controller. This is done to ensure safety when there is traffic or other obstacles while the aircraft is flying.

In accordance with Annex 11 Chapter 2 Point 2.2. Objectives of Air Traffic Services, LPPNPI Kendari Unit is required to provide information and permits to aircraft within its area of responsibility to ensure safety, regularity and smooth flight traffic in the Kendari CTR Zone area with the aim of preventing hazards and improving air traffic services in the Kendari CTR Zone area.

From the description above, the solution that can be used to solve problems in the Kendari Control (CTR) Zone area is that the author suggests the need for a VFR Route to the Bombana area or vice versa to improve air traffic services in the Kendari CTR Zone area, with the VFR Route it can makes it easier for pilots to determine the route that must be passed to go to the factory or port and ATC can also more easily determine the significant position of the VFR flight. Based on the description above, the following author attaches an overview of the VFR Route for VFR Flights from Haluoleo Airport to Bombana Region or vice versa using the Commercial Off The Shelf (COTS) Software method.

Visual signs on the ground (landmarks) are required for the VFR route design process. A reference point with coordinates is required to establish the establishment of a VFR flight path checkpoint. Checkpoints are used to determine aircraft positions along flight routes, there are no specific rules for selecting checkpoints, because each aircraft route has different regional characteristics. Selection of checkpoints must be based on a good ground reference, easily identified and clearly visible from the air. examples of landmarks such as lakes, rivers, roads, buildings or other natural contours. The following is the result of the VFR Route design that the author has designed:





Figure 3. Design of VFR Route to the Bombana Area

The first reporting point is the "Mowil" point which is marked by the existence of the Gontor Islamic Boarding School at that point with the characteristics of a blue-roofed building that reads "GONTOR". The coordinates of the location of the first point are 4° 09' 32.47" S 122° 15' 10.75" E, 15 nm from "KDI" VOR/DME and 38 nm from Bombana Sugar Factory located on radial 247 from "KDI" VOR/DME.

The second reporting point is the "Lembu" point which is marked by the existence of one sub-district within that point, namely the Lalembu sub-district. Within the sub-district there is SMPN 54 KONAWE SELATAN and there is a soccer field. The coordinates of the location of the second point are 4° 19' 53.96" S 122° 05' 24.89" E, 31 nm from "KDI" VOR/DME, 16 nm from the first point, and 22 nm from Bombana Sugar Factory located on radial 234 from "KDI" VOR/DME.

The third reporting point that must be passed by VFR flights from Haluoleo Airport to Paria Port is the "Tambu" point which is marked by the presence of the Tampabulu Dam at that point. The coordinates of the location of the third point are 4° 42' 09.06" S 121° 46' 46.39" E, 22 nm from the second point, 68 nm from "KDI" VOR/DME, 7 nm from Paria Port, and is located on radial 228 from "KDI" VOR/DME.

## V. CONCLUSION

It is not easy for an ATC to create optimal air traffic as desired, because the word optimal also means that one must provide safe, efficient and economical services. VFR Routes are often used to guide VFR flights to destination areas, prevent hazards from occurring and improve the quality of air traffic services in the Kendari CTR zone area, but in practice VFR flights from Haluoleo Airport flying to the Bombana area still do not have a VFR Route. An alternative solution to the problem that needs to be considered is the need for a VFR route for aircraft flying to the Bombana area in order to improve air traffic services in the Kendari CTR zone.

## VI. ACKNOWLEDGMENT

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