

The Airport Wildlife Control Unit Design as the Safety Measure

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ABSTRACT

Safety is the main goal that should be achieved in the aircraft operation activities. Birds and other wild animals could give a serious impact to the aircraft operation activities that could endanger the safety and secure activities of aviation. For this reason, wildlife hazard management is very important to reduce the impact. The goal of the wildlife hazard implementation is one of the efforts to secure the Airport Wildlife Control Unit by manipulating the animals' behavior of their habitats. Based on the regulation of Director General of Air Transportation, Number: SKEP/42/III/2010 Advisory Circular CASR 139-03, the wildlife hazard management is in the area of airport. This research was done by conducting the needs assessment of stakeholder groups to find out the needs related to AWCU. After getting the data, the product design and validation were carried out by experts in the field of safety management system. The results are to form the AWCU and develop procedures to handle wild animals. The aim of the Research and Development is to describe the formation of the Airport Wildlife Control Unit by identifying potential danger of birds and wild animals attack, implementing the habitat management, by conducting birds and wild animals' surveillance and coordinating with related units.

Keywords: safety, wildlife hazard management, wild animals, aircraft operations

A. Introduction

Hang Nadim International Airport is an airport located in the Riau Islands Province where Hang Nadim Batam International Airport is located on the golden triangle trade route, namely between Indonesia, Malaysia, and Singapore (Inpayung & Songjan, 2019). This airport operates in an area of 1,762 hectares with a terminal area of 3000 m² with a runway of 4025 meters long and a width of 45 meters making Hang Nadim International Airport Batam the airport with the longest runway in Indonesia. Every day Hang Nadim Batam International Airport serves an average of $\pm$ 5 million/year, with capacity during peak operating hours reaching $\pm$ 1,400 passengers/day. (Ministry of National Development

Planning of the Republic of Indonesia/National Development Planning Agency, 2019).

Indonesia's landscape between Asia and Australia forms a Wallacea line and a biogeographic line, such as the Weberdan Lydekker line, causing Indonesia to have a very high biodiversity (Amrullah et al., 2021). There are about 515 species of mammals (12% of the world's number of mammals). In addition there are 600 species of reptiles; 1500 species of birds and 270 species of amphibians (Siboro, 2019). Aircraft accidents resulting from wildlife strikes have become an increasing economic and safety concern for the aviation industry (Mendonca & Wallace, 2021). The presence of wildlife, birds and animals on and in the aerodrome vicinity poses a serious threat to aircraft operational

safety (ICAO, 2013). In 2020, 98.8 percent of the 11,605 strikes occurred in the USA. Birds were involved in 95.1 percent of these strikes, bats in 2.5 percent, terrestrial mammals in 2.0 percent, and reptiles in 0.4 percent (Department of Transportation et al., 2021). For this reason, it is necessary to have appropriate wildlife hazard management in accordance with the characteristics of each airport. Wildlife hazard management is a series of activities to control attraction airport against birds and other wild animals (Directorate General of Civil Aviation, 2010).

Mitigation of presence-wildlife attacks can be achieved through reducing the likelihood of possible attacks (Lewis & Caudell, 2016). Investigating and understanding the differences of the wildlife strike index among the seasons of the year may provide valuable information to aviation stakeholders that can be used during the development and assessment of wildlife hazard mitigation techniques (de Tella et al., 2011). Historically, wildlife management at airports has occurred on a relatively small spatial scale compared to the overall use of animal space, which is usually carried out within the limits of airport boundaries. However, the degree of effectiveness of this also depends on the surrounding area and the ecology of the species involved (Martin et al., 2011).

B. Methods

Research methods are basically a scientific way to obtain data with a specific purpose and usefulness. In this study, the author used different types of research methods based on the type of information managed and

the intention of a study to be carried out. The types of research methods that are classified based on the information managed are Research & Development methods, Research & Development methods are process or steps to develop a new product or perfect an existing product, which can be accounted for (Pradana, 2019).

In this study, the author only took level 1 Research & Development in accordance with the provisions of the department, where the researcher conducted research but did not continue by making products and did not conduct field reviews. In this case, the research carried out only produces the product design, and the design is validated internally (expert and practitioner opinions) but is not produced or not tested externally (field advancement).

To conduct this research, there are several stages in the preparation of this research. The following are the stages of research:

The preliminary research is intended to find out the background of problems in the management of wild animals at Hang Nadim International Airport Batam, and what potential can pose a hazard to the sacrificial operation. In the preliminary research, the author used instruments in the form of observation studies and documentation studies.

A Need Assessment is carried out to find out what kinds of products are needed and what needs to be prepared to design the Airport Wildlife Control unit at Hang Nadim International Airport Batam. In this study, the author used instruments in the form of unstructured interviews. The need assessment was carried out on 10 ATC personnel at the LPPNPI Company Batam Branch and 10 airport officers at Hang Nadim Airport, Batam.

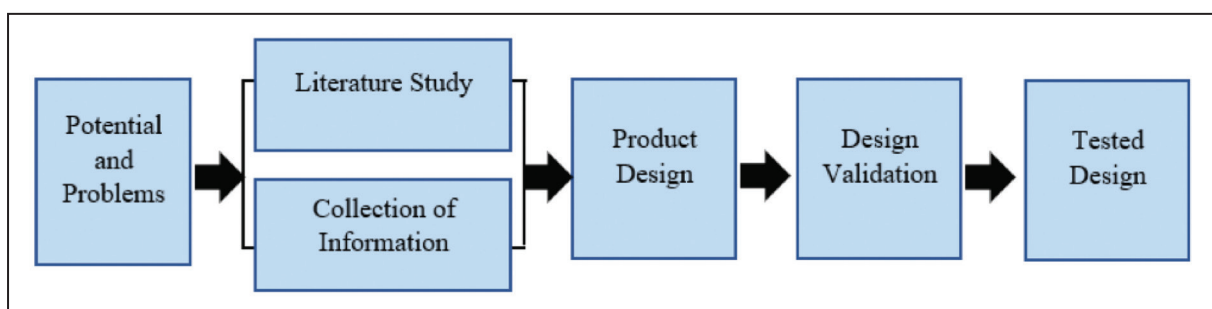


Figure 1 Stages of Research

After knowing what kind of product is needed to design the Airport Wildlife Control unit at Hang Nadim International Airport Batam, the next stage is to design the product. The product to be designed is a unit that handles wild animal management issues and the concept of the unit.

This stage is carried out after the product is completed, that is, validating the product to

three experts. The author chose three experts who felt competent in this design for this study, namely; (a) Expert lecturer in the field of safety management systems, (b) ATC personnel from Perum LPPNPI Batam Branch who are experts in the field of safety management systems, and (c) Field practitioners dealing with wild animal problems.

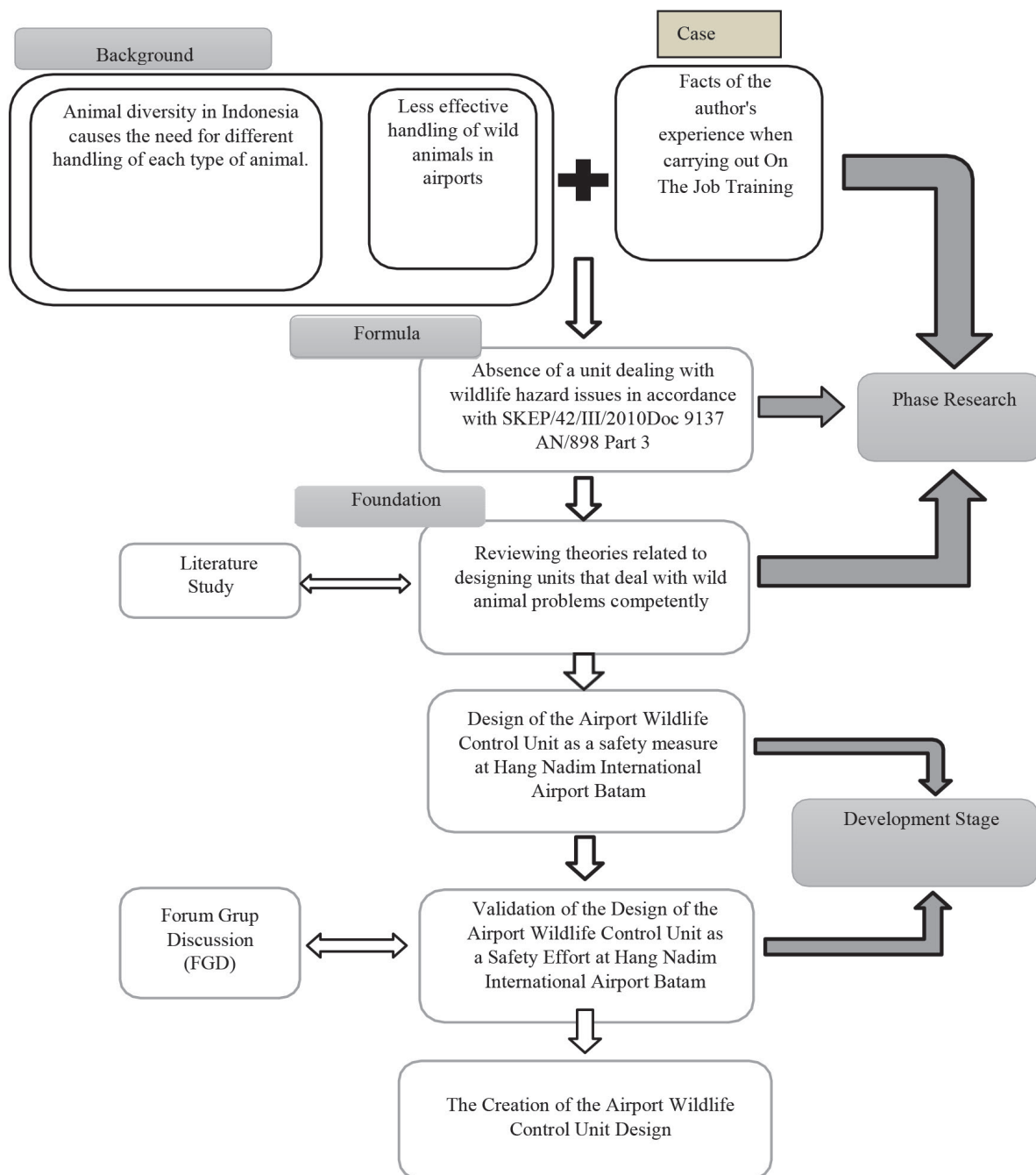


Figure 2 Thinking Framework

At this stage, the author use instruments in the form of unstructured interviews and questionnaires. The data collected from data collection activities may be too small in number or maybe too large. Even though there are enough amounts, data or information must be processed in order to become meaningful information.

In this study, the author used a Thinking Framework in the process of designing the Airport Wildlife Control unit which can be seen in Figure 2. The Thinking Framework is a guide in the implementation of research because the preparation of a Thinking Framework must be based on supporting theories.

C Results and Discussion

Based on the results of direct observation and data collection, the results and discussion of this study are described as follows.

1. Food Sources

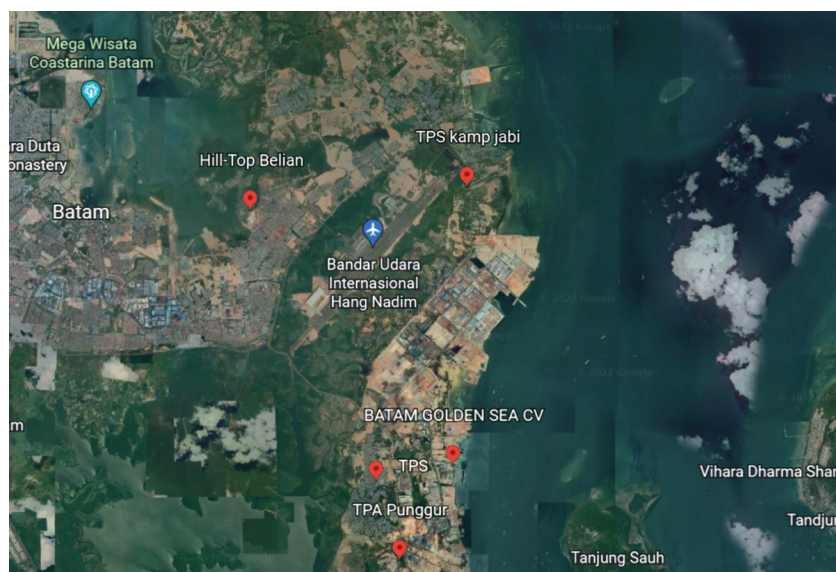
Based on the results of unstructured interviews when conducting need assessment research to two respondents (ATC Perum LPPNPI Batam Branch) there are still several fruiting trees around Hang Nadim Batam International Airport, even though there should be no source of food for animals around the airport (ICAO, 2012).

Establishment of a process with the local planning authorities for consultation on proposed developments that have the potential to be wildlife attractant within 13 km of the aerodrome, in fact there are five garbage disposals located within a radius of 13 Km of Aerodrome Reference Point (ARP) (ICAO, 2012).

It is not in accordance with what is recommended by International Civil Aviation Organization (ICAO), therefore there needs to be further evaluation in this regard. In the documentation review, there are still things that are not in accordance with the established rules. It can be known that there are still presence of wildlife and food sources for wildlife so that it can be an attraction for animals (NISTREANU & LARION, 2021), to be around Hang Nadim International Airport Batam.

2. Wildlife Report

Based on the data above that has been collected there are sixty reports of wildlife attacks that occurred at Hang Nadim Batam International Airport, this of course must be controlled in order to reduce the occurrence of wildlife attacks in the future (Radomska et al., 2021). Coupled with the author's experience when conducting On The Job Training (OJT) at perum LPPNPI Batam Branch, the author found that there was a discrepancy with what



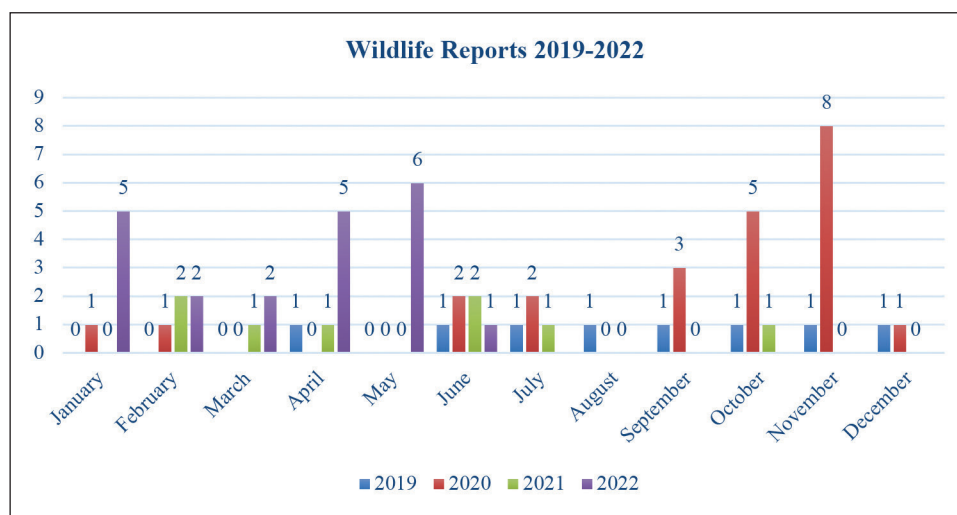
Source: Google Earth, 2022
Figure 3 Garbage Disposal

was stated in the Letter of Coordination and Agreement (LOCA) between AVSEC and the Air Traffic Controller (ATC), namely when there was a report about wildlife, AVSEC as the organization in charge of wildlife

hazard management problems could not be contacted (Letter of Operational Coordination Agreement Tower - AVSEC, 2015), this is supported by the data that the author has collected below.

Table 1 Distance Garbage Disposal from Aerodrome Reference Point Hang Nadim Batam

No.	Garbage Disposal	Distance From Hang Nadim ARP
1.	TPS kamp Jabi	5,7 km
2.	Hill-Top Belian	3,16 km
3.	Batam Golden Sea CV	5,69 km
4.	TPS	5,78 km
5.	TPS Punggur	7,78 km



Source: LPPNPI Batam Branch
Figure 4 Wildlife Reports 2019-2022

18/08/2022 00:21	Birds/windmill hazard in aerodrome vicinity	LNI 374	PK LHZ	0730	IFB	Approach	WED	Scheduled	00:18 TOWER SEE FLOCK OF BIRDS ON RUNWAY 04 AND INTERSECTION DELTA. TOWER TRY TO DROP BIRDS USING THE SIRINE 5 TIMES, BUT NO EFFECT TO BIRDS. WE HAVE ONE INBOUND RELEASE RWY 04 POSITION 10NM FROM TOUCHDOWN (LNI 374) 00:19 TOWER TRY CALLING AVSEC (3 TIMES), SAFETY AND LANDASAN. BUT, ONLY LANDASAN UNIT PICKED UP THE CALL. 00:21 LNI 374 MAKE GO AROUND RUNWAY 04 DUE TO FLOCK OF BIRDS ON RUNWAY 04 00:23 LANDASAN ENTERING RUNWAY FOR DROP OF BIRDS. 00:26 RUNWAY CLEAR REPORT BY LANDASAN, AND THEN LANDASAN LEAVING RUNWAY PROCEED TO TAXIWAY PARALLEL VIA TAXIWAY CHARLIE FOR DROP ANOTHER BIRDS. 00:27 LANDASAN LEAVING THE AIRSIDE AND REPORTED THAT RUNWAY AND TAXIWAY CLEAR.
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Source: Perum LPPNPI Batam Branch, 2022
Figure 5 Written Event

3. GAP Analysis

Table 2 GAP Analysis

Item to Analysis	Existing Condition	Ideal Condition	Result	Solution
According to SKEP/42/III/2010 on wild animal management, there are already things that must be done by the airport, and also according to the recommendations of ICAO in Document 9137 AN/898 Part 3 Wildlife Control and Reduction recommendations to reduce the presence of wild animals, namely through an ecological approach.	There are several things that have not been implemented in accordance with SKEP/42/III/2010 concerning wild animal management and an ecological approach has not been taken to reduce the presence of wild animals, this is shown by the fact that there are still several animal species that are free to roam around the airport and also food sources for wild animals.	It is necessary to apply optimally to the hazard management of wild animals in accordance with SKEP/42/III/2010 and also the implementation of an ecological approach in accordance with Document 9137 AN/898 Part 3 Wildlife Control and Reduction to reduce the presence of wild animals around the airport.	If the hazard management of wild animals has not been maximized in accordance with SKEP/42/III/2010 and an ecological approach has not been implemented in accordance with Document 9137 AN/898 Part 3 Wildlife Control and Reduction, it is feared that there will be continuous reports of wild animals and may interfere with flight operations.	Designing a unit that is responsible for wild animal problems and is also equipped with ecological knowledge that can be applied at Hang Nadim International Airport Batam.

4. Training

Each Airport Wildlife Control personnel is equipped with an ecological understanding and knowledge of animal habits as well as skills in capturing wild animals that affect flight operations appropriately (ICAO, 2012). As well as a wide range of training that is useful for the course of hazard management of wild animals (Martin, et al., 2013). The Objectives of the Training Program is imperative for Airport Wildlife Control personnel to take action in wildlife hazard management with wildlife training and habitat training (Fuller, 2017). The objectives of this training are: Ensure the training plan meets international, national and local standards; Ensuring appropriate management of wild animals; Ensure that control measures are in accordance with airport conditions including training plans; Ensure that all personnel understand the necessary procedures and practices; Provide training programs that are appropriate to airport conditions.

Contents of the Training Program is to improve Effective management of wild animals depends largely on each personnel's understanding of wild animal management through ecological and other understandings, such as: Regulations, standards and guidelines;

Manual of procedures for controlling wild animals; Habitat management; Problems outside airport boundaries; Active management; Techniques for the removal of wild animals; Planning for the management of wild animals; Development and implementation of programs; Monitoring; and Training records and schedules.

5. Habitat Management and Habitat Modification

Habitat management is perhaps the most important method to prevent or reduce wild animal infestations in and around airports (Lewis & Caudell, 2016). The existence of things that can be of interest to wildlife should be reduced Tobajas et al., (2022), once it has been identified a wildlife hazard management plan should be developed either to reduce the number or remove it entirely (Steele & Weston, 2021). It can be done by manipulating species and/or limiting the height of vegetation at the airport, the removal of bush bushes that fence the airport, the selection of plants that are not attractive to wild animals (ICAO, 2012).

Wild animals are attracted to certain places foraging, breeding, occupying certain areas. Efforts were made to reduce the attractiveness of the airport (Mafaza & Haryati,

2022). By creating vast expanses of grass, low vegetation or even a lack of vegetation present at the airport (Aydemir, 2022). The presence of many buildings and hangars with trees and bushes adjacent to the airport can provide suitable habitat for many species. Therefore, it is necessary to identify and evaluate things that are of interest to wild animals so that they can be effectively reduced, eliminated, or managed (Sommer & Ferraro, 2022), so as to achieve a long-term solution to the problem of wild animal attacks.

If the airport environment is made less attractive to existing wild animal species, they will look elsewhere for their needs and the wild animal population at the airport will decline significantly (Mendonca & Wallace, 2021). Along with the number of wild animal attacks. By modifying the habitat, it is possible to modify the quantity and type of wild animals actively flying at the airport. Listed below with an explanation of what features are interesting and what steps can be taken to overcome this; (1) Buildings – providing a place to create nests, shelters, and breeding for animals; (2) Open water – provides a place for drinking, breeding; (3) Trees, shrubs, fruitful plants – provide a place to make nests, create dwellings and breeding; and (4) Grass – provides a place to forage for birds.

Controlling the attractiveness of airports towards wild animals becomes very important, if airports provide resources that are easily accessible to wild animals such as food, water, temoat stay, then they will continue to try again despite the deployment tactics used to deter. Habitat management to prevent wild animals involves two processes, namely identifying and implementing steps to avoid evidence of

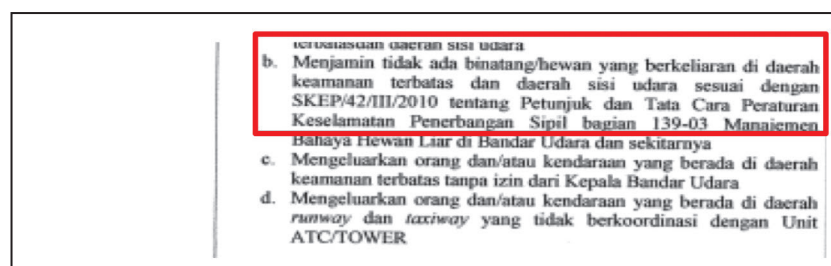
this documentation as well as its process and implementation should be kept (Soldatini, et. al, 2011).

6. Wildlife Hazard Management Plans

Wildlife Hazard Management Plans are outlined in a document created to provide strategies to reduce the risks wildlife pose to flight operations (ICAO, 2012). The plan is based on an assessment of the danger risk of wildlife (CAA, 2017). A wildlife control plan should be able to; (1) Identifying wild animal species to reduce the risk of unwanted things happening; (2) Determine the necessary actions to reduce the risks associated with a particular species; (3) Describe communication strategies to ensure that the information necessary to explore the risks of wild animals is shared effectively; (4) Training for Airport Wildlife Control personnel involved in wild animal hazard management; (1) Describe monitoring and evaluation strategies for the entire wild animal control plan; AND (2) Prioritize specialized research to advance the management of wild animal hazards at airports.

With the results of collecting information according to the data collected, the author suggests that the rights and obligations regarding the management of wild animals contained in the Letter of Operational Coordination Agreement (LOCA) between tower units and AVSEC on point b (Figure 6) which means “guaranteeing no wild animals/ animals roaming in the restricted security area and the air side area in accordance with SKEP/42/III/2010 Advisory Circular Civil Aviation Safety Regulation 139 – 03, Wildlife Hazard Management on or in the Vicinity of an Aerodrome.

This is a flowchart of how the Airport



Source: Letter of Operational Coordination Agreement Tower - AVSEC (2015)

Figure 6 Letter of Operational Coordination Agreement Tower – AVSEC

Wildlife Control unit can perform its duties at Hang Nadim Batam International Airport by implementing the Wildlife Hazard Management Plan.

7. AWCU Procedure

After the author conducted an analysis with non-standard observation signs, they conducted a documentation study on the LOCA (Letter of Coordination and Agreement) between ATC and AVSEC. With all the provisions that have been set, the author found several things that were not appropriate when carrying out the control. Whereas the unit in charge of wild animal management has repeatedly failed to request wild animal reports, this has had a significant impact on the course of flight operations. According to ICAO Document 4444, "Air Traffic Management, Sixteenth Edition," Subchapter 7.4: Information to Aircraft by Aerodrome Control Towers, explains that when there is

a report regarding a wild animal attack, the unit responsible for wild animal management issues must carry out an inspection or take action as soon as possible.

The author also conducted a documentation study on Document 9137 AN/898, Part 3: Wildlife Control and Reduction, where an ecological approach is needed to reduce the presence of wild animals around Batam's Hang Nadim International Airport.

The author also conducted need assessment interviews with air navigation service providers, namely ATC personnel and airport personnel. This interview was used to support the drafting of the Airport Wildlife Control Unit. In this interview, it can be concluded that it is necessary to have a new unit that addresses the problem of wild animal hazard management at Batam's Hang Nadim International Airport to improve the quality of

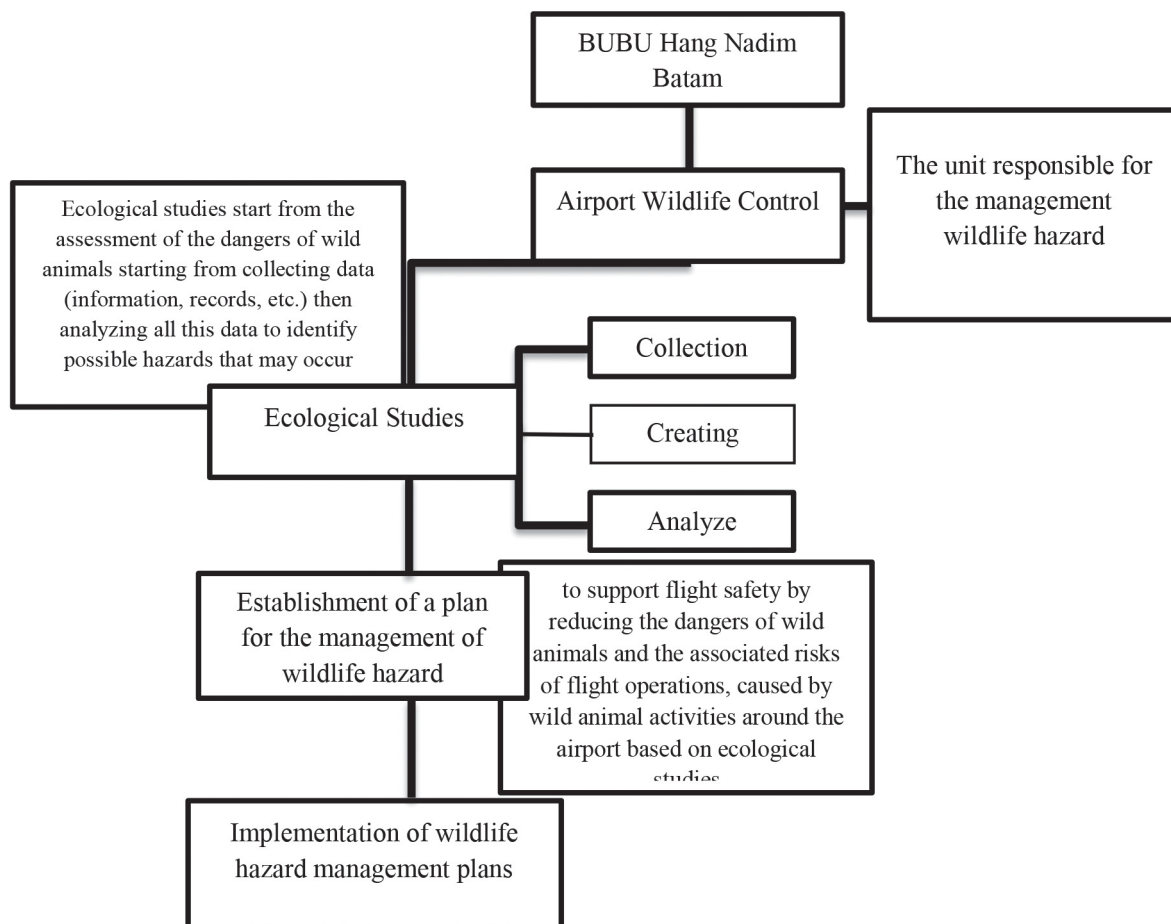


Figure 7 Flow Chart

Table 3 AWCU Manuals

Chapter	List of Content
1	AWCU Purposes
2	AWCU Tasks
3	Role and Responsibilities
4	Competency Standards
5	HIRA
6	Wild Animal Control and Reporting
7	Plan to Control Wild Animals
8	Training
9	Habitat Management and Modification
10	Wild Animal Patrols
11	Requirements Candidates for AWCU Personnel

safety. The author used the results of analysis, needs analysis interviews, and documentation studies as material for making a provisional design, which was then developed and validated by three experts.

D. Conclusion

The ineffectiveness of wild animal management that has been implemented by Hang Nadim International Airport Batam is supported by the fact that there are still many wildlife species that roam the air and there is also still a source food for wildlife. The design of the appropriate Airport Wildlife Control unit at Hang Nadim International Airport Batam is a unit that carries out the management of wild animals in accordance with SKEP/42/III/2010 and overcomes the problem of wildlife through an ecological approach in accordance with Document 9137 AN/898 Part 3 Wildlife Control and Reduction.

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