

Providing Air Traffic Services to Unmanned Aircraft Vehicles in Banda Aceh's Airspace

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Abstract— Nowadays, aircraft are becoming more and more important and talked about due to the rapid development of aircraft in the past few decades. In addition, we must also remember that this aircraft is an important object under air law. Aircraft that were once the result of modifications from hot air balloons have now far developed into aircraft that can be flown remotely, or currently known as drones. Even with the rapid development of drones in the last few decades, it cannot be matched by the progress of air law arrangements both internationally and nationally. With such conditions, both international air law and national air law have not been able to fully guarantee flight safety (safety first), which is the spirit of aviation as contained in the 1944 Chicago Convention, which states that the convention mandates that the growth of safe and orderly international civil aviation be guaranteed. The 1944 Chicago Convention obliges the state to ensure flight safety, including Indonesia. The intended flight safety is where every flight must be guaranteed safety by the country concerned, including civil aviation, military aviation, and drone flights or unmanned aircraft, because their operation using remote pilots has the potential to cause accidents.

Keywords—Aircraft, Drone, Safety

I. INTRODUCTION

In Minister of Transportation Regulation No. 37 of 2020 concerning the Operation of Unmanned Aircraft in the Airspace Served by Indonesia, unmanned aircraft vehicle (UAV) or drones have a definition as a flying machine that functions with remote control by the aviator (pilot) or is able to control itself using aerodynamic laws. Where the pilot in this case is referred to as a remote pilot.

Initially, drones, or unmanned aircraft vehicles or systems, or UAVs or UAS, were developed exclusively for military purposes. However, subsequently, they have become widely used in civil applications across a variety of fields, such as disaster management [1], the delivery of goods and information [2], search operations [3]; [4], surveillance [5], managing wildfires [6], relay for ad hoc networks [7]; [8] wind estimation [9], civil security [10], agricultural and remote sensing [11], traffic monitoring [12], healthcare and health-related services [13]; [14]; [15], and emergency medical services [16].

In a webinar entitled "Drone Industry Outlook 2022," held by Terra Drone Indonesia on January 22, 2022, it was said that the development of drone technology is increasing every year, supported by the need and potential for its use, which continue to be developed by both

individuals and companies. It is also predicted that the drone market in the world will increase by 13–15% for the next 5 years. Asia itself is the region that is expected to experience a significant market increase, which is dominated by Japan, China, India, and Southeast Asia. Droneii, a drone market research company, also predicts that industry revenue will reach \$15 billion by 2022, which comes from hardware, software, and the use of drone services themselves. Furthermore, for drone users themselves in Indonesia, data taken by the Unmanned Systems & Technology Association (ASTTA) states that currently there are at least 104 companies (mostly MSMEs) engaged as unmanned systems and technology industry players, with a composition of 52% as service providers, 27% as manufacturers, and 15% as distributors or resellers.

The commercial drone population (drone value < IDR 20 million, main use for hobby) increased by 30% over the past year, with the drone population as of August 2021 increasing from 60,000 drones with a market value of IDR 30 billion to 90,000 drones with a market value of IDR 50 billion. The industrial drone population (drone value > IDR 20 million, primary use for work) is currently at 5,000 to 10,000 units with a market value of IDR 100 billion to IDR 170 billion. More than 95% of drones in circulation are foreign products. The number of commercial pilots has increased by 30% over the last year, with the number of pilots as of August 2021 ranging from 35,000 to 50,000. Of these 50,000 pilots, only around 2,500 (5%) already have a license from the Ministry of Transportation; the rest are still in the process or will just take part in certification activities that are currently held by four parties that have been authorized by the Ministry of Transportation, namely:

- PT Drone Edutek Indonesia as a Drone Training Center.
- PT Terra Drone Indonesia as a Drone Service Provider.
- Indonesian Drone Pilots Association as a professional association.
- BP3 Curug as a government-run flight school.

With all the data and facts that occur in the field showing a significant increase, it is ideal for the Indonesian government to start providing air traffic services to these drones. Regulations should begin to be updated so that these UAVs can operate in controlled airspace and that air navigation service providers, in this case Perum LPPNPI (AirNav Indonesia), can create a framework for a standard



operating procedure for handling UAV flights so that all air traffic control personnel understand how to provide services to UAVs in their respective areas of responsibility.

II. METHOD

Observation is often called observation. Observation is often used to trace or find out something about a phenomenon. Observation is usually done by reviewing, monitoring, and examining an object until it gets valid data. According to Muhammad Ilyas Ismail in the book *Learning Evaluation: Basic Concepts, Principles, Techniques, and Procedures*, observation can be interpreted as one of the data collection techniques that is more specific than other techniques [16]. In general, observation aims to collect data that can be used to answer various problems that arise. In addition to collecting data, observation is carried out with the aim of obtaining a conclusion about the observed object. Observation also aims to describe an object and everything related to the object being studied.

III. RESULT & DISCUSSION

However, the larger the number of operating drones, the higher the risk of accidents in the sky. This not only endangers civil aviation regarding security and infrastructure but also decreases traffic safety. Recently, some of the most notorious drone-related accidents have been reported [17]. Moreover, numerous cases have been reported in which a drone almost collided with an airplane. There was over 700 drone near-miss incidents reported by pilots between January and August 2015, according to data recorded by the FAA [18]. In addition, an investigation of a dataset of drone accidents and incidents in Australia was presented by Milad and Mojtaba [19], which showed that two categories of the accidents and incidents are equipment issues and a lack of coordination between aerial activities. Therefore, managing and regulating drones in traffic flows is necessary.

Previously, Perum LPPNPI Banda Aceh Branch Office had collaborated with the Banda Aceh City Transportation Office to conduct counseling on the implementation of PM 37 of 2020. Furthermore, in terms of providing air traffic services to unmanned aircraft vehicles or drones, the author finds that Perum LPPNPI Banda Aceh Branch Office must have a temporary standard operational procedure (TSOP) so that the provision of services to unmanned aircraft operators or drone operators is clearer and there are no irregularities in its operation. For now, ordinary people are free to buy types of unmanned aircraft vehicles or drones, but they do not understand if the operation should not be careless because it can interfere with the course of flight traffic, especially in the airspace handled by Perum LPPNPI Banda Aceh Branch Office. The main purpose of making this TSOP (temporary standard operating procedure) is:

- Clarifying the operation of unmanned aircraft in the airspace to be more orderly, clear, and precise;
- The creation of supervision in the operation of unmanned aircraft or drones carried out in an

integrated manner in order to maintain airspace security and flight safety

In making this TSOP (temporary standard operating procedure), the author wants to include several things, such as:

- Airspace where unmanned aerial vehicles or drones may operate;
- Airspace where unmanned aerial vehicles or drones may not operate;
- Priority position of unmanned aerial vehicles, or drones, over manned aircraft
- Pre-operation coordination procedures for unmanned aerial vehicles, or drone coordination and communication procedures during the operation of unmanned aerial vehicles, or drones;
- Post-operation coordination procedures for unmanned aerial vehicles, or drones

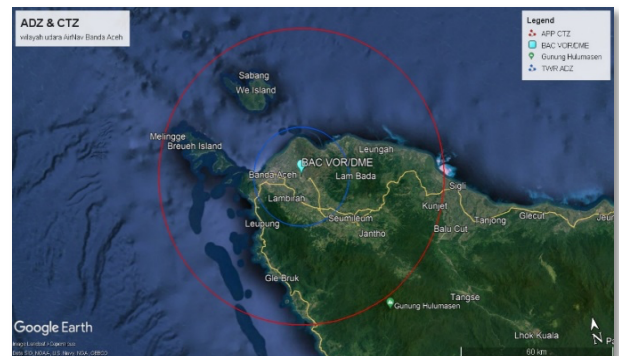


Fig. 1. Aceh TWR/APP airspace responsibility

Later, with the issuance of the existing TSOP (Temporary Standard Operating Procedure), in addition to containing regulations that must be obeyed, there was also knowledge about providing flight traffic services to unmanned aircraft or drones. The following is a draft of the TSOP (temporary standard operational procedure) that the author designed based on two seminars that the author attended about unmanned aerial vehicles, or drones, held by the HTP (Association of Course's Cadet) Air Traffic Controller Division, coupled with discussions with ATC seniors who are indeed designers of SOP (Standard Operation Procedure).

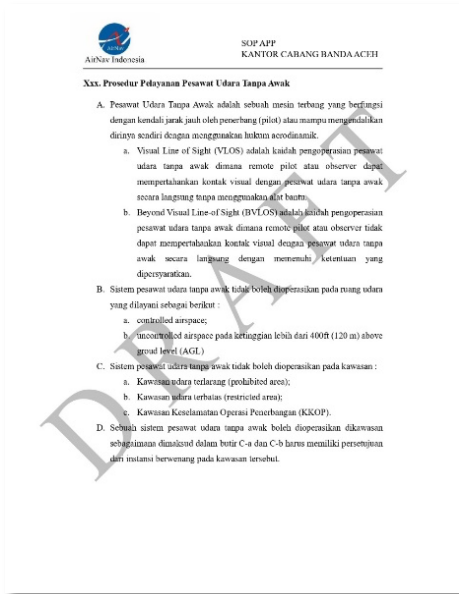
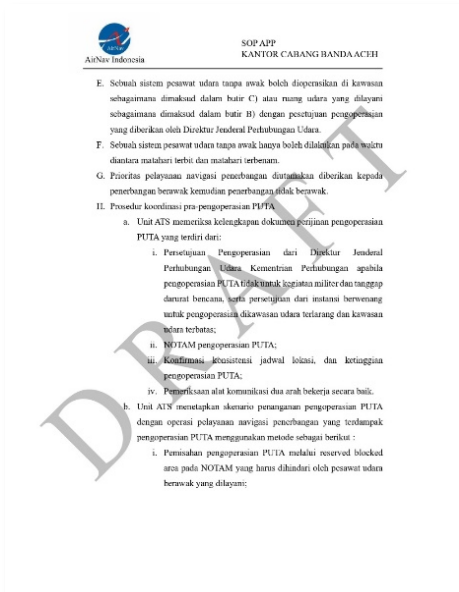
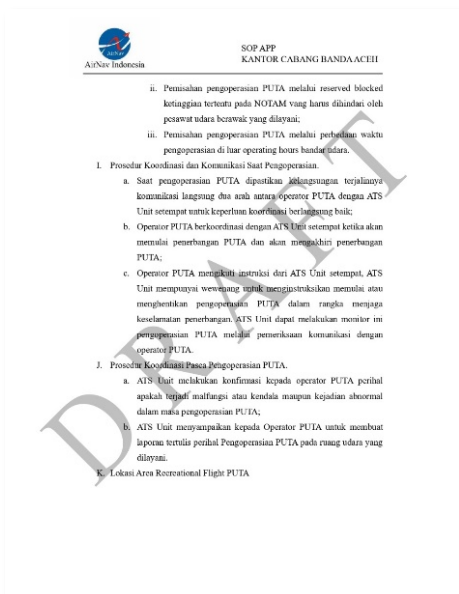


Fig. 2. Draft Temporary Standard Operation Procedure



In addition to the creation of a TSOP (temporary standard operating procedure) for providing air traffic services to unmanned aircraft or drones, the author also has a design for an airspace that will later be included in the AIP (Aeronautical Information Publication), which allows unmanned aircraft or drones to fly with an altitude limit of 400 ft (120 m). At the time of this writing, the author obtained a reference from the UTM (Unmanned Air Traffic Management) document. At the time of this writing, the ICAO (International Civil Aviation Organization), the center of the aviation world, has just released this UTM as a framework that will continue to be discussed in the future. Currently, the discussion of UTM by the ICAO (International Civil Aviation Organization) has only reached the third volume.



The ICAO UTM is a fulfillment of the request for all countries and regulators to agree on a proposal for traffic management of unmanned aircraft systems (UTM). However, without adequate international harmonization, this could impact safety, security, the environment, system reliability, and economic efficiency. Through UTM, it is expected that Civil Aviation Authorities (CAA) and Air Navigation Service Providers (ANSP), to the extent they are involved, will be able to provide real-time information on airspace constraints and flight destinations available to UAV's operators, directly or through UTM service providers. The UAS operator will then be responsible for safely managing its operations within these constraints without receiving air traffic control services from the ANSP (air navigation service provider). While UTM as a concept is under development, mutual agreement on its framework and principles is essential to ensuring global harmonization and interoperability. To achieve this, ICAO is leading the efforts of countries, UAS industry leaders,

academic institutions, and aviation professionals towards the development of this framework for UTM.

In addition, the Federal Aviation Authorities (FAA) have begun to implement UTM in their airspace. This can be seen in the UTM Concept of Operations Version 2.0 (UTM ConOps v2.0), a document regarding the operation of a UAS using the UTM principle, which can operate side by side with the Air Traffic Management (ATM) principle so as to create an airspace where UAV can operate in controlled airspace. With this, the author wants to implement it in the airspace area controlled by Perum LPPNPI Banda Aceh Branch Office (controlled airspace). So that at least ordinary people who fly unmanned aircraft or drones with hobby purposes (recreational flight) can fulfill their hobbies without having to violate and coordinate with Perum LPPNPI Banda Aceh Branch Office as a flight traffic organizer.



Fig. 3. Design plan of UAV or drones recreational area

IV. CONCLUSION

The world of aviation at this time can be said to be in a recovery period. After being hit by the COVID-19 pandemic storm, the world of aviation is gradually becoming normal again. But even in the wake of the COVID-19 pandemic, innovation in the world of aviation has not subsided. Innovation in the world of unmanned aircraft or drones is still ongoing and increasing in use. Evidently, in yesterday's panic, the Chinese government used their unmanned aircraft or drones to spread messages to stay at home during the pandemic, so that the spread of

messages could be done without physical contact between humans.

In these legal corridors, content supports and assists drones' flight operations. UAV or Drones are allowed to operate in many fields. According to their registered specifications, operators have the right to decide on the drone management model in the permitted area. There has not been any classification or limitation on the technical characteristics of drones from the government.

Therefore, providers or organizers of air navigation services must always be prepared for the conditions in which unmanned aircraft or drones have begun to operate. In Aceh Province itself, although unmanned aircraft or drones have not operated much, it can be used as momentum to "prepare an umbrella before it rains" so that when there is an increase in unmanned aircraft or drones operating in Aceh Province, Perum LPPNPI Banda Aceh Branch Office is ready with all forms of software and hardware equipment to provide flight traffic services to unmanned aircraft or drones. The author hopes that by making TSOP (temporary standard operational procedure) and the existence of its own airspace to freely fly unmanned aircraft or drones, it can make the provision of flight traffic services undisturbed both between manned and unmanned aircraft and between unmanned and manned aircraft.

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