Application of Police Drones in Road Traffic Management

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Abstract: Using uavs to carry out road traffic management work aims at remote monitoring of regional traffic, passenger flow monitoring and early warning, expulsion of illegal stop and so on, participate in the handling of traffic accidents, public security organs use uavs to bring convenience to social traffic management, and use uavs to strengthen the construction of intelligent public security. This paper studies the basic condition of UAV application and how to make full use of UAV to standardize and manage road traffic, and also studies the new skills of police UAV in road traffic, hoping to have a certain positive effect on promoting urban road traffic management, and also bring some reference for relevant scholars.

1. Introduction

With the rapid development of our socialist market economy, the life happiness index of our country's social residents is increasing year by year, the number of private cars owned by citizens is increasing rapidly, and therefore road traffic accidents occur from time to time. The speed of handling traffic accidents is also in urgent need of improvement, and the development of road traffic situation in our country is not optimistic, especially the behavior of road congestion and illegal parking in popular scenic spots during holidays in China has seriously affected the normal travel of citizens. This paper takes A police station as an example, using UAV to carry out road traffic mapping and long-range actual combat horizon to broaden the scope and management efficiency of road traffic management, optimize the road traffic management system by using the new patrol mode of "police personnel plus UAV ", reduce the situation of road traffic congestion, realize the strong police of science and technology, and reduce the work burden for the police[1] .

2. Basic Overview of UAV Applications

Since December 2018, A police station has used police drones to carry out traffic accident handling, has been tested for three months, the mileage is up to 700 kilometers, the flight time is about 3500 minutes, the handling of more than 150 traffic accidents, so that the scene of the scene shooting of the UAV will be transmitted to the A police station's integrated command in real time, the man-machine signal appears in the A police station jurisdiction to achieve comprehensive control. Even inclement weather and conditions, drones can operate normally at winds below level 6 and in light rain. From the comparison of the data of the first-line police handling accident and the police UAV handling accident, it will save about 50% of the time for the UAV handling traffic accident, greatly improve the efficiency of handling the accident, and make the road traffic jam obviously improve[2] .

3. Explore the Construction of a New Three-Dimensional Road Traffic Management Mechanism

3.1. To Explore the Three-Dimensional Perception System of "Open Space"

Police drones are highly mobile and sensitive. Police officers can be helped to carry out on-site control and use drones to test open spaces, such as the upper and lower ramps of highways, rail

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lines, maternal and child health hospitals and large hospitals. During the holidays, especially during the holidays, the police station should carry out aerial surveillance of the road in the scenic area, return the real-time image by air patrol, conduct the comprehensive command and road traffic evaluation, which can relieve the working pressure of the front-line police personnel, avoid the long-time road congestion, and make the public travel by publishing the information of road traffic in the scenic area to make it convenient for the public to travel. Applying the UAV to the police work, constructing the three-dimensional sense system of "open space" is beneficial to the timeliness and precision of the police work, and the risk control of the front-line police work is gradually transformed and intelligentized [3].

Figure 1 Police drones

3.2. To Explore the Three-Dimensional Prevention and Control System of "Open Space"

Police UAV can realize remote control and remote control, according to GPS positioning and over-the-horizon flight and other advanced technology to help frontline police staff to achieve road traffic diversion, improve the efficiency of police work. Using the unmanned zone over-the-horizon flight can also collect image information, tracking location, face recognition, patrol prevention and control, which is more comprehensive and accurate than the previous ground police work. The police UAV can complete the blind areas and dead corners of some areas, and establish a comprehensive "open space" three-dimensional prevention and control system, which provides strong support for the security work of large-scale activities, emergency emergencies, traffic management, etc., to ensure that there is no prevention and control dead corner within the jurisdiction. The drone can also achieve air shouting, especially at traffic junctions with large traffic flow and along subway lines during peak vacation trips, using air shouting to remind illegal vehicles, conducting remote dredging and traffic accident investigation, so as to make traffic unimpeded in the area under its jurisdiction.

3.3. To Explore the Three-Dimensional Disposal System of "Open Space"

At present, the police station A has achieved certain results in the application experience and technology of the police UAV, and the UAV can also be applied to the traffic management department and the administrative department, so as to realize the "open space" three-dimensional disposal system, so that the police work can be carried out quickly, efficiently and accurately, and the police UAV can realize the air video forensics, three-dimensional on-site investigation, camouflage and ground ambush, and coordinate with the work of the ground police personnel, which makes the dimension of the investigation work more three-dimensional. At present, the intelligence of police UAV is more and more advanced, with the help of the development of scene intelligence, let UAV long-range flight service, provide help for police work, crack down on very hidden illegal and criminal activities, and improve the level of investigation. Especially in the accident of traffic exposure, the UAV can help the police to realize the high-altitude fixed-point shooting and all-round shooting, record the traffic accident image and evidence, the UAV can

complete the video forensics and photo forensics in a short time, and transmit the data to the integrated management system in time, so that the police can have a comprehensive understanding of the scene when they arrive at the scene of the accident, and make the handling of the traffic accident more efficient and convenient. In addition, drones patrol the area on a regular basis to issue a timely traffic warning, providing reliable data for citizens to travel and reducing the likelihood of road congestion[4].

4. Exploring New Skills in UAV Policing

4.1. Air Operations, Remote Disposal of Illegal Parking Problems

There are many important places in the area under the jurisdiction of the A police station, such as universities, commercial circles, party and government organs, so the parking resources and road traffic appear to be a little tight, and the problem of temporary parking in the area under control is extremely obvious, especially at the light rail along the area, and the phenomenon of illegal parking is particularly prominent. A police station uses drones for remote monitoring to control the UAV flight altitude at about 100 meters, and then, with the help of the police investigation observation of the integrated command office, records the license plate of illegal parking in time, and drives out vehicles in violation of the rules and regulations.

Figure 2 Air operations

4.2. Regional Monitoring and Timely Warning of Passenger Flow Activities

A The police station is very famous for a scenic spot in the area under the jurisdiction of the police station, whether it is a weekend or a holiday, there will be a large number of passenger flow, traffic flow, so the police station uses drones to carry out traffic inspection and traffic forecast around the scenic spot, and use emergency plan to coordinate the police deployment and traffic diversion of the scenic spot. For example, during the National Day, there will be a backlog of vehicles at the B entrance of the scenic spot, resulting in serious road traffic congestion, so the use of drones for traffic diversion, this manual combination of intervention can allow congested traffic to disperse to another entrance, to ease road traffic pressure.

4.3. To Hover Over the Capture and Assist in the Establishment of a Chuck for Public Order

In the work of checking the public security chuck, especially in the night, because of the lack of the assistance of the air angle, if there is the phenomenon of instantaneous punching card, the vehicle can not be accurately detected and located, resulting in the work become cumbersome. Even after the police work to make corresponding adjustments in the inspection of drunk driving work there is still a card escape phenomenon. Therefore, the police station used the way of UAV cooperation to carry out the wine driving inspection work, set the UAV in the front of the card check 50 meters, and maintain the flight altitude of about 50 meters, to accurately record the license plate information of the intercepting vehicle, if the situation of punching, UAV can also track and locate the vehicle, greatly improve the efficiency of the security set check chuck.

4.4. Mobile Starter to Participate in Early Emergency Disposal

It is easy to have group incidents and sudden incidents in some areas of the city, and the police can be arranged to carry out on-site work after air detection and collection of scene size and portrait information using police drones. This way can improve the efficiency of the police and make the work of the police more targeted.

4.5. Drawing in Time to Improve the Efficiency of Accident Handling

In the traditional police work, it is generally by the police of the police station to deal with and arrange all the road traffic accidents in a unified way, including the timely arrival of the scene, the scene of the accident to obtain evidence, after the traffic diversion and recovery, which has a great pressure on the front line police work. Therefore, the use of drones to participate in the accident scene of the traffic accident handling team to camera and take photos, so as to obtain timely evidence, provide a strong basis and guarantee for the subsequent traffic recovery and responsibility determination, but also greatly improve the efficiency of accident handling, but also for the first-line police workers to reduce the burden of work.

Figure 3 Increased alarm speed

5. Conclusion

To sum up, the application of drones to urban road traffic management is an important manifestation of social scientific and technological progress, but also an important way to optimize police work. The application of UAV to urban traffic management has greatly reduced the working pressure of front-line police staff, improved the efficiency of road traffic management, effectively alleviated the road traffic jam situation, and made the urban road traffic get effective diversion. The new patrol mode of "police personnel + drone" with high-tech police force has been widely concerned, and it is believed that it will be updated and broken through in the process of police work in the future.

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2) Key research project of social science in zhengzhou in 2019 "research on traffic congestion control in zhengzhou from the perspective of new smart city construction" (JX20191054)

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