Research Based on the Police Teaching of UAV Course in Public Security Colleges

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Abstract: As drones are more widely used in warfare, their role in warfare is also becoming more and more important. However, compared with the popular high-tech research of drones such as remote sensing, communication, and virtual reality, the system's research on police drone operator's cognitive ability requirements and training is relatively inadequate. The drone education in public security colleges also has problems such as mode, academics, and teachers. Based on the current development situation of drone skill training in China, this paper conducts targeted curriculum research and exploration, and through teaching practice, preliminary exploration , an effective strategy suitable for the teaching of drone manipulation in public security colleges is presented.

Keywords: college, unmanned aerial vehicle (UVA), teaching

1. Preface

As drones are more widely used in warfare, their role in warfare is becoming more and more important. U.S. military drones are at the world 's leading level, with advanced technologies, wide applications, and a wide variety of drones, including relay communications, electronic countermeasures, reconnaissance and attack, and strategic, operational, and tactical drones . Since the 1990s, China's military drones have developed rapidly, and dozens of target aircraft and reconnaissance drones have been developed in succession. In February 2017, the successful first flight of a new generation of reconnaissance and surveillance drones further promoted the rapid development of research and application in the field of drones in China[1][2]. However, compared with the research on high-tech UAVs such as remote sensing, communications, virtual reality, etc., the research on the cognitive abilities and training of police UAV operators by public security systems is relatively inadequate. The police drone operator has become a new professional position. However, the research on the training of police drone operators in public security colleges is still in its infancy.

2. The development history of police drones

In 1947, the US police first used aircraft to carry out police activities. In 1994, the Public Security Bureau of Wuhan City, Hubei Province, China took the lead in adopting helicopter law enforcement nationwide, and played a huge role in criminal investigation, traffic management, emergency rescue and other aspects of police work. After 2006, cases of law enforcement using police unmanned helicopters began to appear around the world. Since 2011, the police in Beijing, Guangdong, Hubei, Jiangsu, Xinjiang and other places have begun to explore the law enforcement model of police drones, which is mainly used in large-scale event security, road traffic monitoring, and drug cultivation.

3. The current status of the cultivation of UAV manipulators in China

3.1 Current status of college education

The training goals are drone design and manufacturing talent, not drone control. In 2017, there will be 91 vocational colleges that will recruit students for drone application technology, including the first Xi'an Aeronautical Vocational Technical College in 2011, which opened the country's first drone application technology major. Among 91 vocational colleges, the longest professional development time related to drone application technology is six years[3]. Although the professional development of drone application technology in some vocational colleges in China has been developing well in recent years, there are still some unsatisfactory areas in the specific teaching, such as the course and course setting of the drone major Reasonable, the professional level of teachers needs to be improved, and the relationship between the theory and practice of professional teaching content is not so close.

3.2 Current status of social institution training

At present, the social institutions that cultivate drone manipulators mainly include AOPA (Chinese Aircraft Owners and Pilots Association) training institutions, DJI Huifei Training Center, and Jifei Academy.

The AOPA training institution is based on the "Notice on Issues Related to the Management of Civil UAV Piloted Aircraft System Pilots" (Cihangfa [2014] No. 27) and the "Interim Provisions for the Management of Civil Unmanned Aircraft Pilots" AC-61-FS-2013-20) and other relevant regulations to carry out civil drone pilot aircraft system training. The training level includes pilots and captains; the training categories include fixed-wing, multi-rotor, and helicopter; the training cost depends on the training category and level. As of December 31, 2016, the total number of civilian drone pilot certificates is 10255 people, mainly distributed in various civil drone production and R & D enterprises, related application units and colleges, etc., there are 158 drone driver training institutions with training qualifications[4].

DJI Huifei UAV Application Technology Training Center was established on June 6, 2016, focusing on drone industry applications, providing training for pilots, industry advanced and equipment maintenance.

Jifei College was established on October 10, 2016. The training content is mainly agricultural plant protection. The training level includes drivers and instructors[5].

Although AOPA training institutions have a large number and a wide distribution, they are expensive and the quality of training varies. The drones used by DJI and Huifei in the training of drone manipulators are their own brand drones. This is also in order to boost the sales of drones, and is mainly aimed at the cultivation of plant protection drone pilots[6].

3.3 The teaching status of police drone operation skills in our school

Unmanned aerial vehicles have been widely used in public security systems. The police force needs a large number of professionals to carry out unmanned aerial vehicle operations to meet the growing needs. As one of the major public security schools, our school currently has no drone teaching courses and lacks the ability to train relevant personnel. Therefore, it is of great practical significance to carry out drone application courses to fill the gaps in our school.

4. Practical problems in police drone teaching in public security colleges

4.1 Problems of teaching teachers for police drones

At present, public security colleges and universities do not have sufficient theoretical knowledge reserves for police drones, and the practical training experience is not systematic enough. The research direction of teachers in public security colleges does not have specialized personnel in the field of drones or police drones. In field teaching, teachers often have no idea. Some teachers usually have the confidence in theoretical knowledge and lack practical teaching confidence.

4.2 Current teaching material problems in police drone teaching

The current teaching content should be mainly based on four-rotor drones, which is conducive to ensuring the comprehensive quality of teaching. However, the current teaching materials for police drones in public security colleges have just started, ignoring the technical content, which will lead to the deviation of the development trend and direction of the education of drones.

4.3 Practical problems in police drone teaching in public security colleges

At present, private multi-rotor UAV professional education is still in the "Warring States Period" under the guidance of enterprises. Human-machine talents are out of touch with the actual domestic demand, but also out of touch with the domestic police affairs.

5. Teaching strategies of drone courses in public security colleges

5.1 Targeted interspersed theory teaching to ensure smooth access to further education

UAV is a science and technology projects with considerable technical content. In order for students to really learn how to operate a drone, they must not only understand how to "move" but also how to "protect" it. For people who are familiar with the structure and principle of the machine, the aircraft is as easy to operate as its own body parts. Students in the course of the operation in accordance with the principles of practical problems to look for. And the theoretical knowledge learned in the early stage is interspersed with the theoretical course content.

5.2 The use of a micro UAV Quadrotor training simulator model, and a first stage, proficiency

Various countries and regions have different climates, geographical environments and laws. Qualified drone operators should have excellent control skills and good adaptability in order to handle all kinds of emergencies and ensure the safety

of people and equipment. Due to the large take-off weight and high motor speed of large and medium-sized UAVs, they are dangerous and uncontrollable under the influence of surrounding objective environmental factors.The micro four-rotor UAV has the advantages of convenient operation, flexibility, safety, and low cost. It is relatively easy to get started, and the basic operation method is similar to the method of large and medium-sized multi-rotor UAVs. Therefore, in addition to the training simulator, the first phase mainly four micro UAV rotor as training models, training completion time of at least more than 100 hours per person. After the stabilization, the multi-rotor police drone can be used as a training machine in the second stage to ensure that the students have good operational proficiency and find and solve problems during the training process. Work proficiently in response to various unexpected situations. For the school, while controlling the cost of use, it can also ensure the safety of students at school[7].

5.3 Improve the scientific effectiveness of teaching

The task of public security colleges is to deliver professional related and practical talents to each grassroots level. How to cultivate police talents who can seamlessly connect with front-line execution tasks actually becomes the key to a healthy and sustainable development. At present, the drone profession is a new professional direction for our school. In order to better adapt to the needs of grass-roots business, we need to cooperate with some qualified and experienced colleges to avoid detours. Obtain first-line technical support and teaching method guidance. At the same time, we should actively establish a network of students 'graduation internships.

5.4 Effective scientific training according to the actual situation of students

Generally speaking, drone training is similar to sports training. The difference is that the pursuit of sports is faster, higher, and stronger, and the direction of drones is to train a group of technical operation personnel with good psychological qualities and excellent technology. Therefore, physical training can be set up, and professional teachers can conduct scientific physical training for students, so that the students' physical strength and physical coordination can be improved, ensuring that they can maintain good control of the drone in different states and different environments , Laying a solid foundation for efficient police execution.

5.5 Establish an effective assessment and evaluation mechanism

The evaluation of unmanned aerial vehicles starts from the four aspects of theoretical learning, simulator training, basic flight ability and comprehensive flight ability. In addition, according to the assessment standards and methods of the drone pilots and captains of the drone pilots and pilots of the Ministry of Public Security, and as the ultimate goal, the assessment and evaluation methods suitable for the students of public security colleges can be formulated.

With the in-depth reform of public security work, in the face of the urgent need of public security professionals and police practical personnel for the construction of public security teams, actively carry out research on the training methods of police drone operators and the teaching of drone courses to improve The training efficiency of police drone operators shortens the training time of police drone operators, so that the police drone equipment can be used in various police enforcement actions such as public security systems in the shortest possible time after police operations Form combat power internally to promote the development of the technical capabilities of the entire system of police drones. Actively carry out the teaching of actual combat skills in police affairs, strengthen the education of actual combat, coordinate the teaching and training resources of colleges and polices, and promote the extension of teaching in colleges and universities to the actual combat of public security. The goal of enhancing the comprehensive strength of the actual department of public security.

References

[1] Chen Zili, Xi Leiping, Tian Qingmin. Exploration on teaching mode reform of UAV Equipment Support Professional Post Education. *Continuing education*. 2015; 29(07): 77-79.
[2] He Zhichao. Modeling and attitude control simulation of multi rotor aircraft. Professional Committee of control theory of Chinese society of automation, Chinese society of systems engineering. Proceedings of the 33rd China Control Conference (Volume B). Professional Committee of control theory of Chinese society of automation, Chinese society of systems engineering: Professional Committee of control theory of Chinese society of automation. 2014: 404-409.
[3] Jiang Lingzhi. Analysis of the professional demand of UAV development for Higher Vocational Education. *Knowledge economy*. 2013; 11: 164.
[4] Jiang Lingzhi. An analysis of the role of aeromodelling in UAV Higher Vocational Education. *New West* (theoretical Edition). 2013; 11: 125.
[5] Fan Guangwei. Characteristics and functions of UAV technology and development trend in China. Proceedings of

2016 (the sixth) China International UAV system conference, Chinese Academy of Aeronautics: Chinese Academy of Aeronautics. 2016:31-34.

[6] Fan Yongfei. Application characteristics and development trend of police UAV. *China security*. 2018; 06: 42-44.

[7] Tang Qianjin, Xu Zheng. Application and development direction of police multi rotor UAV. *Journal of Wuhan University of Technology* (information and Management Engineering Edition). 2017; 39(02): 239-242.