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**ASSEMBLY — 41ST SESSION**

**ECONOMIC COMMISSION**

**Agenda Item 39: Other issues to be considered by the Economic Commission**

**THE ROLE OF UNMANNED AERIAL VEHICLE (UAV) LOGISTICS IN SUPPORTING  
URBAN LOGISTICS IN CHINA**

(Presented by China)

**EXECUTIVE SUMMARY**

Compared with traditional manned delivery methods, unmanned aerial vehicle (UAV) delivery is featured by the application of smart and information technology and the ability to transport small batches of parcels at high frequencies, with benefits of higher delivery efficiency and lower costs. Civil Aviation Administration of China (CAAC) has been exploring the application of UAV logistics in urban environment since 2019. In 2019, CAAC issued an Approval Letter for the Trial Operation of Specific Types of UAV in Urban Environment and the License for the Use of UAVs in Delivery to Antwork, which were respectively the first of its kind in China. It is also the first project in the world to be approved for trial operation of UAV logistics in urban environment. In 2020, CAAC approved Jiangxi Fengyu Shuntu Technology Co., Ltd., a subsidiary of SF Express, to launch a pilot “low-altitude UAV logistics delivery system” in Guangdong-Hong Kong-Macau Greater Bay Area, the world’s first UAV logistics delivery pilot project carried out in a world-class city cluster. The application of UAV logistics plays a salient role in contributing to cost reduction, efficiency and quality improvement of urban logistics, and will help promote the upgrading of the logistics industry to intelligent logistics.

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| <i>Strategic Objectives:</i>   | This working paper relates to Strategic Objective — <i>Economic Development of Air Transport</i> . |
| <i>Financial implications:</i> | Not applicable.                                                                                    |
| <i>References:</i>             | Not applicable.                                                                                    |

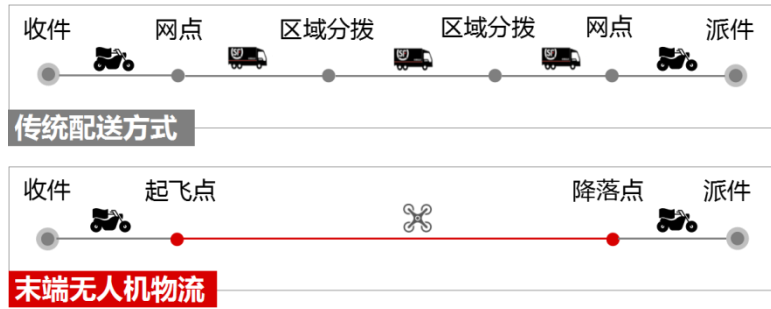
<sup>1</sup> English and Chinese versions provided by China

## 1. INTRODUCTION

1.1 In the context of rapid economic development, urban logistics has become an important engine for economic development and plays an indispensable role in the process of economic development. However, logistics is still a labor-intensive industry, and high costs have become a pain point restricting the development of the logistics industry. Urban logistics is troubled by ground traffic congestion, high labor costs, and consumers' growing demand for high-efficiency logistics. With the development of unmanned technology, unmanned delivery represented by UAVs has become an important option to solve the problems faced by urban logistics. Compared with traditional manned delivery methods, UAV delivery is featured by the application of smart and information technology and the ability to transport small batches of parcels at high frequencies, with benefits of higher delivery efficiency and lower costs. CAAC has been exploring the application of UAV logistics in urban environment since 2019. In 2019, CAAC issued an Approval Letter for the Trial Operation of Specific Types of UAV in Urban Environment and the License for the Use of UAVs in Delivery to Antwork, which were respectively the first of its kind in China. It is also the first project in the world to be approved for trial operation of UAV logistics in urban environment. In 2020, CAAC approved Jiangxi Fengyu Shuntu Technology Co., Ltd., a subsidiary of SF Express, to launch a pilot "low-altitude UAV logistics delivery system" in Guangdong-Hong Kong-Macau Greater Bay Area, the world's first UAV logistics delivery pilot project carried out in a world-class city cluster. The application of UAV logistics plays a salient role in contributing to cost reduction, efficiency and quality improvement of urban logistics, and will help promote the upgrading of the logistics industry to intelligent logistics.

## 2. DISCUSSION

2.1 UAV helps boost logistics efficiency in city clusters. The thriving Internet and e-commerce industries have brought about exponential increase in parcel delivery orders. Mounting parcels and intensive delivery orders, compounded by growing traffic congestion, made it urgent to upgrade the traditional mode of "ground transport + manual delivery", giving birth to UAV logistics. UAV is not limited by urban ground traffic conditions, and can choose a relatively short air route for delivery. Parcels can be delivered more efficiently and in a more timely manner with the high speed UAV can reach. In 2020, the CAAC approved SF Express to carry out its pilot program of "Low-altitude UAV Logistics Delivery System" in Guangdong-Hong Kong-Macao Greater Bay Area. The pilot program showed that the main operation mode of UAV logistics is business-to-business (B to B) transport, in which UAV replaced traditional parcel delivery stations and regional distribution transit links for cargo transport while deliverymen still collected and dispatched parcels at both ends. Some enterprises also adopted the mode of direct delivery from businesses to customers (B to C). UAV logistics reduces transit links, thus saving time and improving efficiency. SF Express has built a two-hour efficient urban logistics circle and achieved a 50 per cent higher delivery efficiency by establishing a low-altitude UAV logistics transport network centered on Shenzhen, which covered the Greater Bay Area and by wisely planning and laying out UAV logistics delivery stations. From 2020 to the end of February 2022, SF UAV has recorded 97 200 movements and 1 833 flight hours in the Greater Bay Area, with a flight distance of around 367 500 km and transporting about 102 000 parcels.



**Figure 1 Comparison between traditional delivery mode and terminal UAV logistics mode**

Traditional delivery mode: Collecting Parcels--Delivery Stations--Regional Distribution--Regional Distribution--Delivery Stations--Delivering Parcels

Terminal UAV logistics mode: Collecting Parcels--Take-off points--Landing points--Delivering Parcels

2.2 UAV helps reduce logistics costs in city clusters. With rising labor cost in the logistics industry, UAV logistics has obvious advantages in lowering labor cost compared with traditional transport because of its less labor force input. China's working-age population (aged 16-59) peaked in 2013 and decreased by 16 million in the following six years from 2014 to 2019. With smaller working-age population, the labor cost in the logistics industry including parcel delivery has been surging. However, UAV logistics can greatly reduce labor force input, improve efficiency, reduce the demand for manual operation and effectively bring down labor cost through artificial intelligence technologies such as automatic flight and unmanned loading and unloading.

2.3 The logistical support mode of urban emergency has been changed by the application of UAV in logistics during the COVID-19 epidemic. During the COVID-19 epidemic, the application of UAV in logistics had a lot of potential in the transport of medical samples and emergency medical materials. In China, some logistics firms have applied intelligent equipment such as drones and unmanned vehicles to provide contactless logistics services to the areas affected by the COVID-19 epidemic, which has improved logistics efficiency, improved poor logistics caused by road blockade in epidemic areas, and effectively prevented cross-infection among people, thus meeting the needs of the COVID-19 epidemic prevention and control with the application of technologies. At present, in some cities in eastern China, drones have gradually served as a main way to transport medical testing samples, which mainly has advantages in three aspects: first, the effectiveness has been improved. Transport time has been shortened to 13 minutes by the application of UAV from 1 hour via the ground transportation. In addition, the application of UAV in logistics will be unaffected by ground traffic congestion; second, transport frequency has been increased. One drone can delivery 800 dose samples at a time with the transport frequency and the testing efficiency both being improved; third, contactless delivery has been realized. The automatic flight and contactless delivery completed by UAV have effectively prevented cross-infection and made people safer. As of March 2022, China SF Express had transported 425 600 medical samples via UAV in Shenzhen with a total of 2 027 flights, 535.19 flight hours and 21 000 km.

2.4 The low-carbon development of urban logistics have been promoted by the application of UAV in logistics. Most UAV are driven by electric power or clean energy, with no emission, which will effectively reduce carbon emissions and meet the concept of green development. As a new technology, the application of UAV in logistics is an effective supplement to traditional transport mode. The deep integration of UAV and other technologies, such as big data, artificial intelligence and block chain, will synergize production capacity, optimize capacity, and realize unmanned and intelligent. Intelligent

logistics, representing by the application of UAV, has contributed to the upgrading and transformation of the logistics industry. With an increase in market demand, the application of UAV in logistics, a new mode of transportation, in more areas, will be conducive to achieve the goal of carbon neutralization.

### 3. CONCLUSION

3.1 The application of UAV in logistics has expanded urban space from two-dimensional to three-dimensional, and greatly stimulated low-altitude economy, which has not only promoted cost reduction, efficiency enhancement and quality improvement of urban logistics, but also improved the application scale of aviation logistics and its service quality. At the same time, the technologies such as big data and artificial intelligence have been integrated in the application UAV in logistics, which has accelerated the transformation and upgrading of traditional aviation services and contributed to the development of regional economy. However, it is noted that the application of UAV in logistics requires the joint efforts of countries around the world to speed up the establishing of the laws and regulations system related to UAV logistics, strengthen policy coordination and support in research, operation and supervision, as well as innovate management mod, so as to form a safe, efficient, smooth and sustainable management and service system for UAV logistics operation.

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