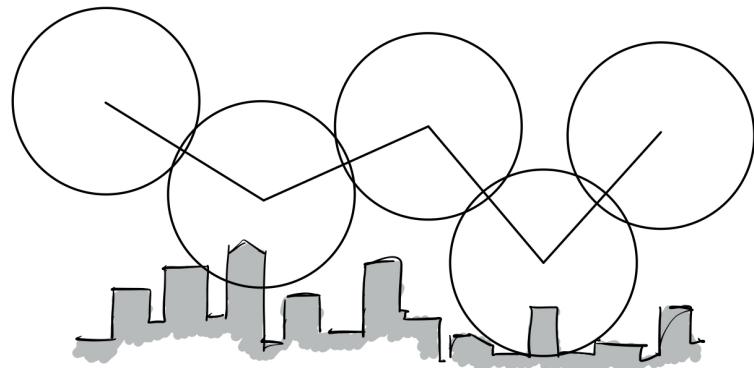


# 21st Generation UAS System

## Business Plan

Haobo Zhao



### **21st Generation UAS system**

62900, Carbondale, Illinois

UAS EAT system

UAS delivery system

UAS emergency system

Haobo Zhao

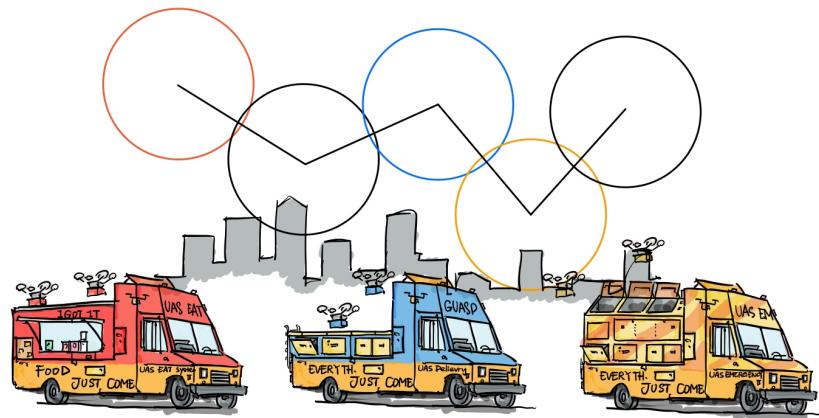
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## 1 Executive Summary

The Generation UAS system business model is using modified UAS and trucks to build a delivery network, using the trucks as moving points and UAS flight rout as lines to create an moving network, could delivery the different cargos point to point, and to execute multiple missions.



The central of the whole business concept is using moving trucks platform to landing and flying UAS, providing the UAS energy change and components exchange. By using multiple trucks moving network and the universal design on trucks and UAS, the UAS could continuing land, recharge, and take off on different trucks then delivery cargos in extended active radius to every point of the region.

This new ideal of generation UAS system has three features, also makes it's major advantage. The first is using universal UAS platform, the platform is a truck contain general equipment for UAS take off & landing, Replenish power and storage. General equipment makes UAS can land on any nearby truck, replenish energy and perform maintenance, which makes the extension of active radius become possible. The second feature of this system is modular design, both truck and UAS, makes it easier to change failed components for UAS and make different uses for truck possible. The third newer design is the truck itself: a platform with wheels, make the transport easier and can run in certain lines continuously like city bus, when there is many lines built in a city, the UAS active radius could cover the whole region.

Based on mobile site's advantages and truck line's large UAS activity radius, the whole logistic system could cover the whole region and fill out hundreds even thousands delivery need just by tens trucks. It could rebuilt the city logistic network by seperate out small or midum package and provide breakfast, lunch and dinner for thousands customers. The other competitiors may finally solve "the last mile" problem but then find the upstream supply chain is outsourced to the 21st Generation system! Compared to other different UAS logisitcs programs like airship, the trucks low cost and highly flexibility do become the major advantages.

The company has three main businesses: UAS EAT system for providing meal and delivery, UAS delievry system to delivery cargos point to point, and providing UAS emer-

gency service whatever provide emergency medical spupply or use UAS equipped with sepcial equipment for different situations.

In UAS EAT system, our major customers like people who have not enough time to cook themself is from 20 to 50 age group, at the same time they are also the main consumer force in the current market. Compared to manned delivery, the unmanned delivery system could greatly reduce cost in repetitive human labor and create new jobs with more trchnical content.

For UAS delivery and emergency delivery, the customer could be anybody. It could be your classmates, your colleges or your company, even the medical center or the government. With the revolutionary UAS logisitc network, we could delivery package from point to point, without influenced by traffic condition. The delivery process is unmanned, people do not need to worry the safty in information. And for emergency service, the cus-tomer could be media, government emergency department or force department.

## 2 General Company Description

The company of Generation UAS System focus on truck-UAS cooperation, aims to using trucks network to provide UAS a extended action radius and make UAS express delivery could cover the whole region.

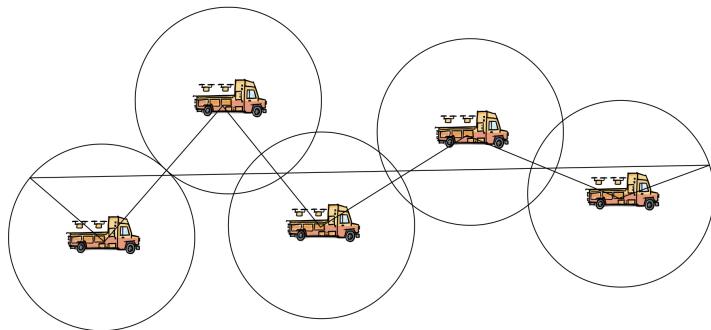


Figure 1: Truck Network For UAs Expanded Active Radius

The central of the whole business concept is using moving trucks platform to landing and flying UAS, providing the UAS energy change and components exchange. By using multiple trucks moving network and the universal design on trucks and UAS, the UAS could continuing land, recharge, and take off on different trucks then delivery cargos in extended active radius to every point of the region.

The company using trucks as universal flying platform, using Modulated UAS provide maximum flexibility for quick maintenance or easily function change, the company has three main businesses: UAS EAT system for providing meal and delivery, UAS delivery system to delivery cargos point to point, and providing UAS emergency service whatever provide emergency medical supply or use UAS equipped with sepecial equipment for different situations.



Figure 2: Three Main Business

However, according to current laws and regulations, this business model still need continuously effort and time to wait the whole environment development about 3-5 years, while the cost would be lower and more convenient for UAS business.

### 3 Products and Services

The Generation UAS system business model is using modified UAS and trucks to build a delivery network, using the trucks as moving points and UAS flight rout as lines to create an moving network, could delivery the different cargos point to point, and to execute multiple missions.

#### 3.1 Product Review—Three Features, Three Advantages

This new ideal of generation UAS system has three main features, also makes it's major advantage. They are universal platform, modular design and using truck.

##### 3.1.1 Feature 1: General Platform

The universal platform is a truck contain general equipment for UAS take off & landing, Replenish power and storage. General equipment makes UAS can land on any nearby truck, replenish energy and perform maintenance, which makes the extension of active radius become possible.

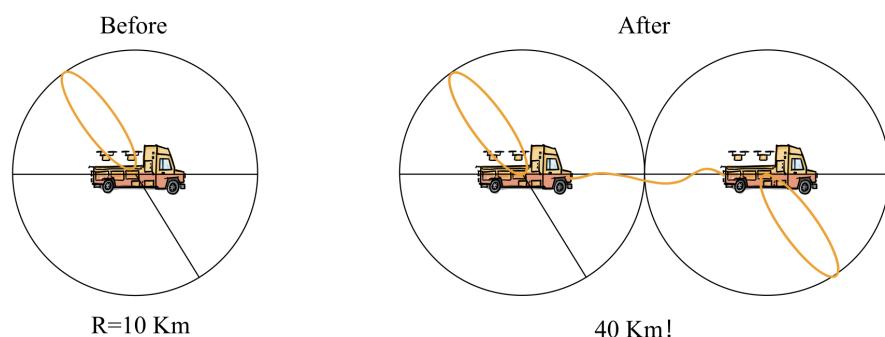


Figure 3: Expanded Activite Radius

##### 3.1.2 Feature 2: Modular Design

The second feature of this system is modular design, both truck and UAS, makes it easier to change failed components for UAS and make different uses for truck possible.

It also makes its a big benefit: Easy To Change Function! Just in few seconds, operators could change the module of UAS cargo compartment for different specialized functions, makes several UASs could relay for one delievry operation, makes long distance relay delievry not just in theory; we can also change the module of trucks for different time and different missions, like use UAS EAT module in major trucks for mealtime, and change to delievry module on other time to maxmize the truck using and control cost.

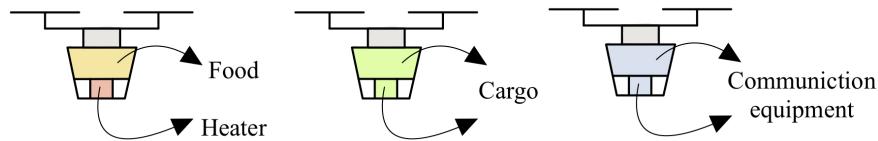


Figure 4: Three Main Business Modular Design

### 3.1.3 Feature 2: Using Trucks

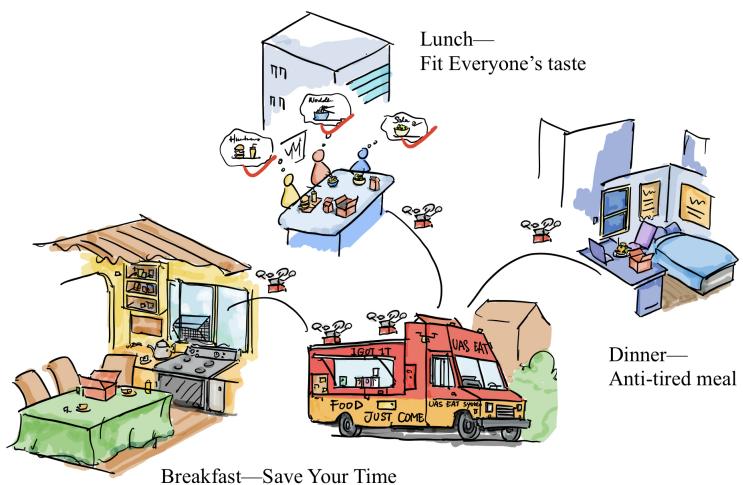
The third newer design is the truck itself: a platform with wheels, make the transport easier and can run in certain lines continuously like city bus, when there is many lines built in a city, the UAS active radius could cover the whole region.

Based on that, the UAS system already have many application scenarios, could create solutions for different living problems.

## 3.2 UAS EAT system



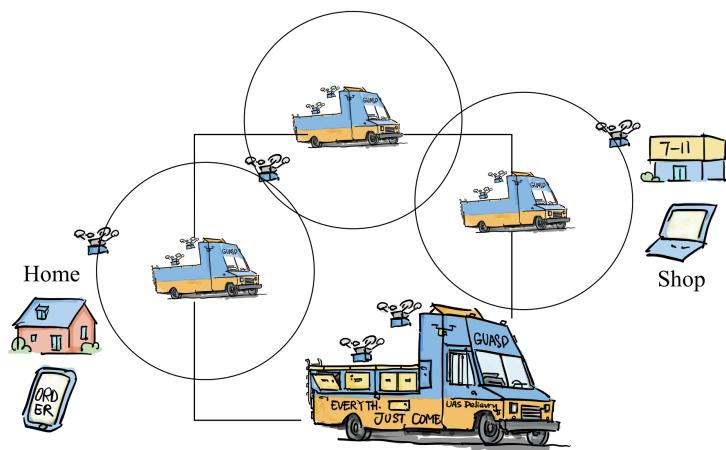
Do you have any of these experiences: get up late that have no time to prepare food for the whole family, or want to have lunch with colleagues but unfortunately today everyone has different tastes, or get home after a working hard day and find you also have to need to prepare food for yourself?



Don't worry, this UAS EAT system could help you! It could cook just on the truck and deliver it by morning food line, give you extra time to dress and prepare to work/

study. It could deliver lunch from different restaurants or UAS EAT system it self, with it incredibly active radius, you can choose any kinds of food you want in town. It also can deliver you a warm dinner, not as same as just food delivery, you can virtually guid the EAT system cook what you want step by step! Don't want to go school in hungry? I got it! Hard to choose restaurant with company? I got it! And for dinner? Of course I got it!

### 3.3 UAS delivery system



The generation UAS system is actually a delivery system in central. The truck contains UAS in certain line continuously running and keep landing and flying UAS every time, many trucks corporation could make the UAV could fly to anywhere of the city. It has a delivery function of course, but for small category or emergency need. If you want to buy something but lazy again—don't want to come out, you can just use the APP and make a order of the system—not only can you buy something from shop, but you can also deliver something to your friends.

### 3.4 UAS Emergency system

For emergency use, it also can make actual help. It will make it possible that there will not much expensive ambulance and rescue systems in future, that we could make the emergency category and professional personnel transport in different way possible—some category can transport by UAS at a relatively low price, and distribute nearby first responder. This will not much occupying emergency resources and few ambulance in a certain region, which will make both the patient and professionals feel convince.

By the way, after change the module of category, it could be modify to signal transport relay system, which will be really helpful in building network or communication system on battlefield or disasters area, it also could build 21st century media system in anywhere.

## 4 Marketing plan

### 4.1 Market research

With the accelerated development of technology and the emergence of breakthrough innovations, UAS are becoming more and more reliable and can be steadily applied in a variety of production and life scenarios, using in far greater propuse. Compared with the huge scale of future applications, the current UAS market is undoubtedly just the tip of the iceberg, but it already contains enough business opportunities.

#### 4.1.1 Target Market outlook

According to the International Trade Administration of United States of America, the global commercial UAS market will grow from \$4 billion to \$40 billion in just 5 years, while only the civil UAS market is expected to reach over \$88 billion over the next 10 years. By using UAS to replacing manned operations, we could saving approximately \$100 billion in the lower total costs and risks.

#### 4.1.2 Major Competitors Analysis

“If you know both the enemy and yourself, you will fight a hundred battles without danger of defeat.” Find out major competitors is the most import mission before really get in to the business. According to the Mordor Intelligence, the prominent players in aircraft delivery frones market are DJI, United Parcel Service of America Inc., Zipline, Deutsche Post AG, Flytrex, and Amazon.com Inc..

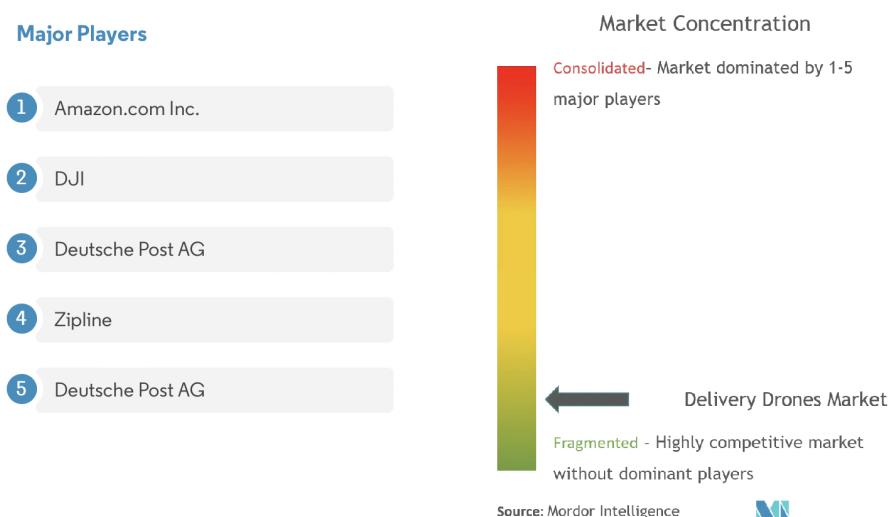


Figure 5: Major players and market concentration

Amazon as a retail giant, domains the logistic network cross the country. DJI as the leading UAS manufacture do have its advantage in UAS itself, its drone express company

Flyrex just approved by FAA to expand its delivery radius to one nautical mile across all of its operationg stations in North Carolina. while other companies have already start their business in different area of the world recently.

Although these companies do have huge influence wheather in its logistics advantages or by advantages in UAS itself, they all focusing on “the last mile” problem, and using fixed sites to transfer UAV (unmanned aircraft vehicle). That makes convenient for management, but greatly limited the operational potential of drones: activities raduis, consistency and so on. The real problem is they failed to see the big picture of the UAS could bring for us, while “the last mile” is only a small part of the UAS can do for us. The not only can upgrade the convenience of delivery to our door, but also has the ability to rebuilt the whole delivery and logisite system of the city.

## 4.2 Competitive Marketing Plan–Features and Benefits

One of our core competitive advantage is our mobile site, using trucks to keep running through the whole city, greatly expanded the space of drones to operate. It makes easier for us to transfer UAS, do not need venue fees and expand the UAS activity radius. The following chart could directly show the several advantages of our mobile sites compared by these fixed sites.

Different Sites	Mobile Site	Fixed Site
Transfer	easy	hard
Venue Fees	not need	need
Drone activity radius	large	small

Table 1: Mobile Site VS Fixed site

Based on mobile site’s advantages and truck line’s large UAS activity radius, the whole logistic system could cover the whole region and fill out hundreds even thousands delivery need just by tens trucks. It could rebuilt the city logistic network by seperate out small or midum package and provide breakfast, lunch and dinner for thousands customers. The other competitios may finally solve “the last mile” problem but then find the upstream supply chain is outsourced to the 21st Generation system! Compared to other different UAS logisitcs programs like airship, the trucks low cost and highly flexibility do become the major advantages.

### 4.2.1 Major Customers

The food delivery is one of our major business. According to the USDA (U.S. Department Of Agriculture) economic research sevrice, the food retailing industries supplied abour \$1.79 trillion wirth of food in 2019, and \$878.2 billion was supplied by food service facilities. The food delivery market is a huge market, and our major customers like people who have not enough time to cook themself is from 20 to 50 age group, at the same time they are also the main consumer force in the current market. Compared to

manned delivery, the unmanned delivery system could greatly reduce cost in repetitive human labor and create new jobs with more technical content.

For UAS delivery and emergency delivery, the customer could be anybody. It could be your classmates, your colleges or your company, even the medical center or the government. With the revolutionary UAS logistic network, we could delivery package from point to point, without influenced by traffic condition. The delivery process is unmanned, people do not need to worry the safety in information. And for emergency service, the customer could be media, government emergency department or force department.

## 5 Management and Organization

The regional department organization chart as follows, the company consists of several such regional departments, each departments focus on regional UAS system safty and steady running.

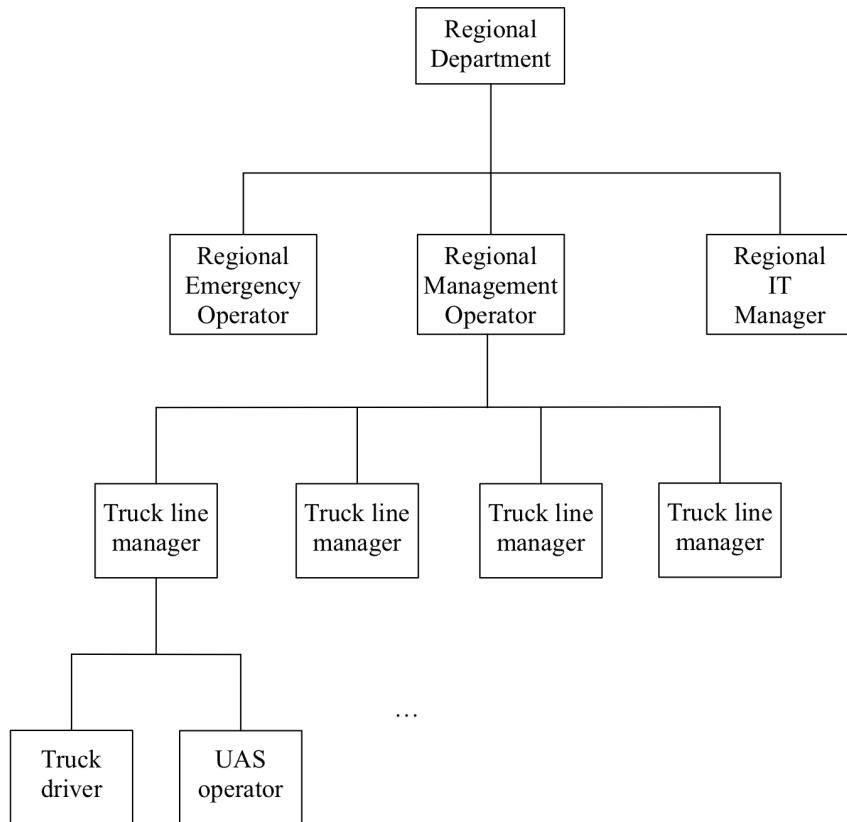


Figure 6: Organization chart

Under the regional department there is three major position: regional emergency operator, regional management operator and regional IT manager. The regional management operator focus on manage truck lines and coordinate UAS delivery and truck lines cooperation. The regional IT manager focus on the computer and automatic service system safty operate, wile the regional emergency operator is responsible for UAS, truck line safty running. Under the regional management operator there is 4 truck line manager, to manage and coo[eration for each line's running and UAS deliver. Under the truck line manager there is a truck group, contain a truck driver and a UAS oparator.

## 6 Financial-Expenses and Capitalization

There will be many start up expenses and normal cost in daily operation, while according to Parsa et al. research, the cost estimate of the UAS business different part shows as follows.

Inputs	Initial purchasing cost of a truck =	\$ 30,000	
	Gas consumption per truck =	600	Gallon per year
	Average gas price =	\$ 3.52	per gallon
	Estimated number of trucks in LA county =	6,586	vehicles
	Estimated number of mail carriers in LA county =	6,586	person
	Estimated salary of a mail carrier =	\$ 45,900	per year
	Number of trucks to replace =	198	per year
	Maintenance cost of a truck =	\$ 2,472	per year
Cost Estimates	<b>Total labor cost =</b>	<b>\$ 302,288,809</b>	per year
	<b>Total truck replacement cost =</b>	<b>\$ 5,927,232</b>	per year
	<b>Total fuel cost =</b>	<b>\$ 13,909,237</b>	per year
	<b>Total maintenance cost =</b>	<b>\$ 16,278,141</b>	per year
	<b>Total operating cost (TOC) =</b>	<b>\$ 338,403,418</b>	per year

Figure 7: Reference Cost Estimate Chart

### 6.1 Total Cost Estimate

Reference on this estimated method, we build up our cost and profit estimate. and we use \$ 70,000 as salary. For total cost, we need to multiply 1.5 for real cost.

Different kinds of cost	price	cost unit
cost of a truck=	\$ 40,000	per year
cost of a UAS =	\$ 2,000	UAS
gas consumption per truck=	\$ 1,200	gallon per year
average gas price =	\$ 5	per gallon
number of trucks every region=	\$ 20	vehicles
number of UAS every region=	\$ 200	UAS
number of personnel every region=	\$ 50	person
average salary of a personnel=	\$ 70,000	per year
Total labor cost=	\$ 350,000	per year
Total truck cost=	\$ 800,000	per year
Total fuel cost=	\$ 120,000	per year
Total UAS cost=	\$ 400,000	per year
Total Estimate Cost=	\$ 4,820,000	per year
Total Real Cost=	\$ 7,230,000	per year

Table 2: Mobile Site VS Fixed site

Our operation cost could be devided to four major group: truck cost, gas cost, UAS cost and personnel cost. Every truck has \$ 30,000 purchasing cost and \$10,000 retrofit with maintenance cost, while every region equiped with 20 trucks. Our UAS has \$5,000 for each with module cost, and 200 UAV could cover the whole region need. Nowadays the gas price has rised significantly, for future sever years, we just use \$ 5 per gallon as

average price. Each region we have 20 trucks, while there will be 50 staff for normal operation,

As shown in the tabel, the total cost of the business is \$ 7,230,000, per year.

## 6.2 Total Profits Estimate

To estimate our gross profits, we using the method from each UAS benefits to the whole profits. We have 200 UAS in each region, so we use this number  $NUAS$  multiply attendance factor  $AFactor$ , which using 0.8. Each UAS could finish 2 operation per hour  $NOperation$ , consider our long distance and multiple UAS cooperation. Averery day we have 20 hours running  $Hour$ , from 6 a.m to next day 2 a.m, Monday to Sunday. The average price per oparation  $Price$  tentatively estimate as \$5. Therefore, the Gross profits estimation formula as follows:

$$\begin{aligned}\text{Gross Profit} &= NUAS \times AFactor \times NOperation \times Hour \times HourtoYear \times Price \\ &= 200 \times 0.8 \times 2 \times 20 \times 365 \times 5 \\ &= \$11,680,000\end{aligned}$$

Therefore, our gross profit is \$11,680,000, while total cost is \$ 7,230,000, our total profits can be estimated as \$ 4,450,000 per year.

Compare to our total cost and gross profits, the total profit is not a small number, and this is only region, while the city as big as Chicago could be divided as 4 region, we could lower the operation price to attract more customers or increase employee salaries to attract more professionals into the company.