

**Air Medical Emergency Services:**

**A faster alternative to ambulances in NYC**

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## **1-Abstract**

New York City is one of the most dense urban areas in the world and like all highly populated cities it suffers from traffic and major delays. Although in general, traffic is just an inconvenience, when it comes to matters of health, it makes it very difficult for ambulances to reach patients on time. This matters especially when it comes to severe accidents or acute myocardial infarction which require immediate response. As a solution to this problem, Heli-Doctor, has devised a plan to create the necessary infrastructure on three major hospitals in Manhattan, so as to support the use of helicopters for emergency medical services. Our plan of work has been divided into three parts; the buying of the medical helicopters, the construction of the necessary infrastructure on the hospitals and the interviewing and hiring of the medical team and technology & inspection team that will be working for us. It will take 6 months to get ready and be operational. The first year of operations will cost \$57,000,000 which includes the cost of buying the helicopters and after that the salaries and maintenance of the equipment will cost about \$7,000,000 / year.

## **2- Introduction**

New York City is one of the most dense urban areas in the world being the home of almost 9 million people. As an average, there are about 3.1 million households in the five boroughs and about 45% of them own at least one car, with 3% percent of them owning three or

more [1]. This has led to the city's roads to be filled with cars, causing traffic and major delays during the three major rush hour zones, the morning, the afternoon and the evening.

In general traffic and delays are simply seen as an inconvenience but when it comes to matters of health it is a matter of life or death. Based on research [1] an early emergency response time between 3-5 minutes in cases where a patient suffers a acute myocardial infarction or is in need of CPR increases the patient's survival rate by 50% - 70% [2] . Unfortunately, in many cases it is very difficult to get at the site due to traffic, leading to a 2.9 - 3.8% [2] increase in deaths; deaths that might have been prevented had the ambulance not have to navigate through intense traffic.

The fact that some of these deaths could have been prevented signifies the need for a different means of transportation for emergency medical dispatchers. In many European and Asian Countries, like Japan, this need is being covered by the use of helicopters that serve as vehicles for the emergency medical dispatchers to get to the site of the person in need, provide all the necessary care that is needed to stabilize a patient and then to transport them back to a hospital as fast as possible.

Our company, Heli-Doctors has devised a plan to create the required infrastructure that will allow this city to support the use of helicopters in the case of civilian medical emergencies.

### **3- Plan of Work**

Our plan to offer a better medical service by using helicopter has three primary tasks:

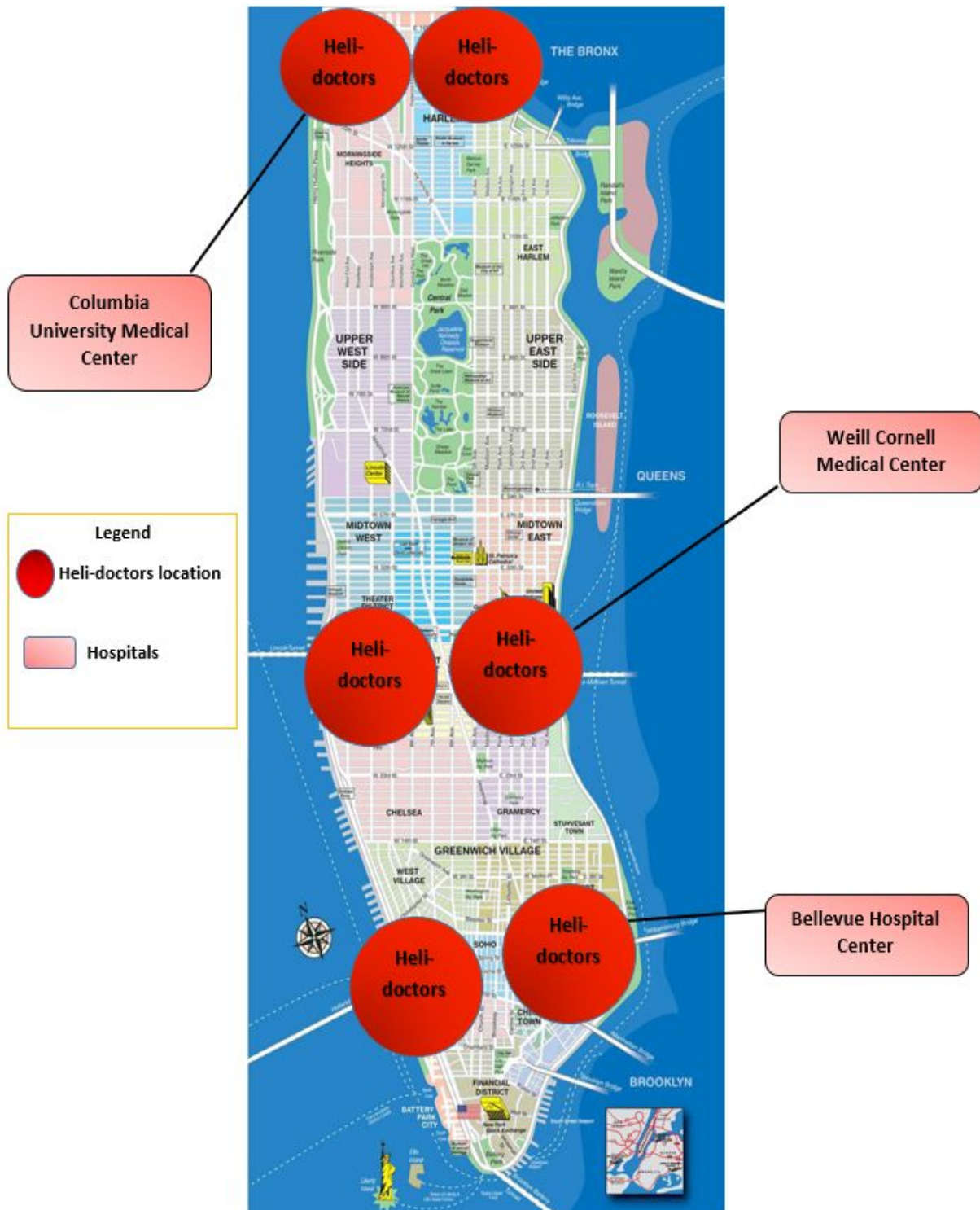
1. To construct physical requirements such as landing pads, and garages.
2. To secure six helicopters equipped with medical operating tools.
3. To interview and hire medical team and technology & inspection team.

**Task 1:** Constructing physical requirements at the three base-hospitals in NYC.

Since a business contract agreement with three reputational hospitals in the city has already been issued, proper construction in order for Doctor-Heli to operate with the most efficient and safe way needs to be conducted. Three base-hospitals are below:

- ❑ **Base 1:** New York – Presbyterian / Columbia University Medical Center (622 W 168<sup>th</sup> St, New York, NY 10032)
- ❑ **Base 2:** New York-Presbyterian / Weill Cornell Medical Center (525 E 68<sup>th</sup> St, New York, NY 10065).
- ❑ **Base 3:** Bellevue Hospital Center (462 1<sup>st</sup> Avenue, New York, NY 10016)

Figure 1: Manhattan hospitals location where the heli-doctors will be



To proceed, building landing pads on each of the base-hospitals is mandatory. The Presto GeoSystem will be in charge of the construction of the landing pads [4]. The company's PadLoc™ connection device allows for assembly of the units to the required mat size, and disconnection of the mats for removal and reuse [4]. This feature of the Presto system is obviously beneficial for Doctor-Heli team to install and disassemble the mat for the future landing points which will be discussed in task 3 [4].

At the same time, constructing garages to keep up with storing and maintenance of helicopters must be done as well. Since it has contained significant tools and kits for patients, regular inspection and maintenance are essential.

Lastly, to maximize the effect of Doctor-Heli, and to minimize the time consumed until the patient gets into the surgery room, Heli-Doctor gained approval to install elevators only for helicopter uses. It secures the shortest path from the roofs to Emergency Rooms.

**Task 2:** Securing six helicopters equipped with medical operating tools.

Heli-Doctor proudly decided to adopt MD902 which has magnificent features since having reliable helicopter is the key for Heli-Doctor. According to an evaluation of the MD902, it has the lowest noise among all of the twin-engine helicopters in the world and it can deteriorate the possible complaints from inhabitants [5]. MD902 (see figure 2 below) also provides a great level of safety through the NOTAR system which generates minimum vibrations in all speed ranges that reduces the stress of patient [5], [6]. NOTAR system is an anti-torque system that eliminates all of the mechanical disadvantages of a tail rotor, including long drive shafts and hanger bearings [5]. Along with the wide cabin, sufficient space is secured that allows

easy access to patient and to use EMS interior ( see figure 3 below) [5]. Lastly, for Full Authority Digital Engine Control (FADEC) technology that MD 902 has, it has the capability of taking off in two minutes from starting the engine which is one of the most indispensable features for Doctor-Heli [5]. FADEC is a system consisting of a digital computer, which can be programmed to automatically take the necessary measures without pilot intervention [6].

**Figure 2:** Examples of Interior of MD902 equipped with medical tools from AeroPartners Incorporated



Medical Console



Stretcher Rear Loading System

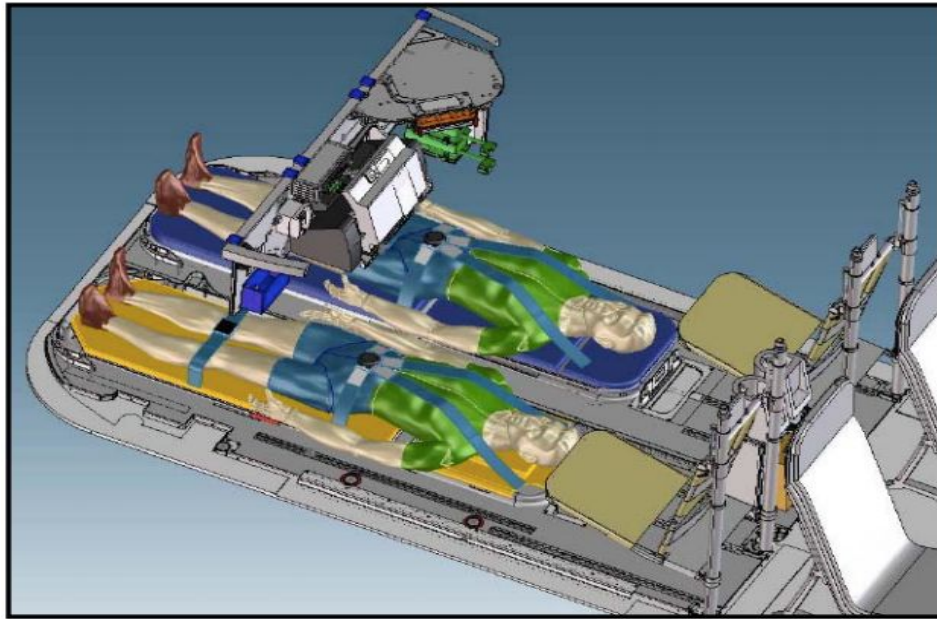


Stretcher Lock Down Equipment

[7]



**Figure 3:** Two Litter Modular EMS platform from MD Helicopters



[8]

**Task 3:** Recruiting medical teams and technology team for each of their jobs.

It is obvious that our main job is to offer a medical service to the public in the city by not only using helicopters but also by competent professionals [9], [10]. At each of the base-hospitals, two medical teams are on standby for 24 hours, led by two professional doctor-surgeons. Each team is composed of a surgeon, a nurse, and two pilots. Qualifications for the team are set reasonably high and specific.

- **Doctor(s):** Who has experience as a surgeon and is trained for Air Medical Emergencies [9].
- **Nurse(s):** Who has a degree in air emergency nursing or certification of Emergency Nursing along with the working experience of 3 years. [10]

- **Pilot(s):** Who has at least 5 years of experience as a pilot with an official license [9].

For the beginning chapter of our business, only given heliports along the riverside and some of the park areas in the city are legally allowed to use [11]. To expand our accessibility, Heli-Doctor also embraces technologies by having a Technology & Inspection team which keeps collecting and integrating data of traffic in NYC, using GPS to determine which streets or park can be used for landing [13]. In order to be able to land on the predetermined landing points legally, multiple Helicopter Landing Permits from the FDNY Public Transportation Unit (PTSU) will need to be issued by a process which takes about 20 days [12]. Although the landing permit for each location lasts for 30 days, it is even better to have flexibility than being stuck at certain landing points only [12]. If something happens around where doctor-heli can not land properly, they are capable of picking up a patient by using safety-rope which is also equipped in Doctor-Heli, meaning that they can drop down the medical team without landing the helicopter.

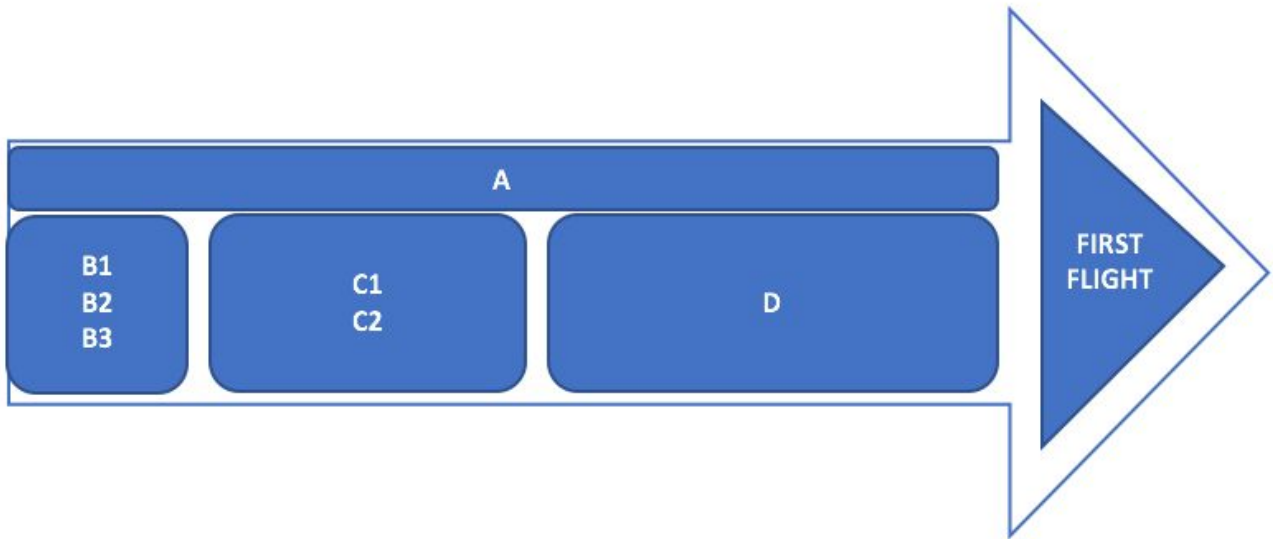
#### **4- Timeline for the construction and implementation schedule**

The Doctor-Heli will begin by building required constructions such as landing pads on the roofs of three base-hospitals. It will only take a solid month at most. Also, elevators must be installed at least one for each of the base-hospitals and it will take approximately one month as shown in the figure 3 below.

The most importantly, it will take six months to secure six helicopters equipped with operating tools including prior inspection.

In the meantime, Doctor-Heli will recruit ‘Technology & Inspection’ Team for three months including setting up specific goals with the whole team. Also, hiring experienced pilots will take two months.

**Figure 3:** Timeline for the first official flight



A	6 months for securing six of MD 902
B1	1 month of construction for landing pads
B2	1 month of construction for elevators
B3	1 month of construction for garages
C1	2 months of recruiting Technology & Inspection Team
C2	2 months of recruiting Medical Team
D	3 months of collecting & integrating data for the future landing spots

## 5-Budget

The Total estimated budget for the first year will be \$65,980,006.

### 5-1-The breakdown of costs and budget

The table 1 below is shown the total cost of the six helicopters that we will buy in addition to the medical equipments needed for the helicopters. The \$41,400,000 [14] costs of the helicopters represent the cost for helicopters and security warranty for one year.

**Table 1:**The total costs of the six helicopters and the medical equipments

	<b>Estimated Cost</b>	<b>Consumption</b>	Total costs
Six MD902 Helicopters	\$41,400,000 [14]	\$1794/ Hour (Fuel Cost) [14]	\$57,197,460
Medical equipments	\$82,020 [14]	-	

Table 2 below is shown the list of specialists to be hired and their estimated salaries for the helicopters. We will need a pilot, doctor and a nurse. The total cost for all the six helicopters staff will be \$6,846,066 / year [15] . \$877,932 / year is the salary 18 employees from the inspection teams ( three employees for each helicopter). The \$928,134/year budget is for 18 employees from the technology teams ( three employees for each helicopter). The budget salary for doctors, pilots and nurses will be for 18 employes in each category(18 doctors, 18 nurses, 18 pilots)

**Table 2:** List of specialist to be hired and their estimated salary for the six Helicopter

<b>Hire Specialists</b>	<b>Estimation salary</b>
Pilots	\$1,620,000 / year [15]
Doctors	\$2,160,000 / year [15]
Nurses	\$1,260,000 / year [15]
Inspection teams	\$877,932 / year [15]
Technology teams	\$928,134/year [15]

Table 3 below shows the cost of construction of the helipads and garages that we need for the six helicopters. We need 120,000 sq.ft that will cost us a budget of \$1,936,480 [16] for the six helicopters. The Presto GeoSystem construction company will charge us \$3,902 / (500 sq.ft. concrete equipment pad) [16] for the construction of the helipads garages and elevators.

**Table 3:** The cost of the construction company that will build the garages ,helipads and elevators.

<b>Hire Specialists</b>	<b>Costs</b>
The Presto GeoSystem construction company	\$1,936,480 [16]

## 5-2-The breakdown of the additional costs after the first year

Table 4 below is shown the estimation budget for the maintenance fee of the helicopters and the medical equipments after the first year.

**Table 4:** The estimated maintenance fee after the first year for the Helicopters and the medical equipments.

	<b>Maintenance</b>
MD902 Helicopters	\$2,100,000 / year [14]
Medical equipments	\$37,800 / year [14]
Total costs	\$2,137,800 / year

## 6-Qualifications and Experience

**Who We Are:** We have several extraordinary well qualified Team members:

- ❖ **Younes Zerhouni** received his Bachelor's degree in Biomedical Engineering from the City College of New York-CUNY and he earned a Master's degree in Public Health and Air emergency from Johns Hopkins University. He had worked in Air emergencies with different companies for more than eight years. He knows the systematic work methods of the air emergency jobs. He developed many concepts such as linking the emergency contact to the police department. He volunteered in many countries in Africa and Europe in the emergency services.

- ❖ **Orestis Stefanis** finished his degree in Civil Aviation and worked as a private pilot with famous celebrities. He had another degree from Massachusetts Institute of Technology in flight mechanics and maintenance. He successfully completed a military air traffic control training program. He had been working as a helicopter pilot for more than nine years with the AirMedCare.
  
- ❖ **Homin Lee** finished his MBA in business Intelligence & Data Analytics at Harvard business school. He is a financial analyst for start-up businesses and entrepreneurs. Lee has had more than eight years of experience working as a financial analyst for healthcare companies such as Pfizer and Oscar Health. He takes charge of providing the business team with an accurate estimate breakdown and costs of the services. He also worked as a flight data processor such as flight times of airplanes and transmitting information to flight operations and command centers.

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