1 Executive Summary

Cities with large populations experience a lack of efficient metropolitan travel due to traffic congestion, a lack of readily available parking, and public transportation deficiencies. These drawbacks of the currently available modes of travel have provided an opportunity for Urban Air Mobility (UAM) vehicles to move people throughout an urban market far faster than currently possible while simultaneously alleviating some traffic. Urban Air Mobility involves fleets of electrically powered vertical take-off and landing (eVTOL) aircraft flying throughout cities to move people around. While UAM vehicles are a rapidly evolving mode of transportation in the early stages of development, the concepts of operations are being designed to involve smaller autonomously piloted aircraft. As technology improves with the advances of high-powered electric motors and batteries, new and more advanced designs for these vehicles are becoming more prevalent.

Several problems still face UAM preventing its entry into market. One main problem is reliable operation during adverse weather. New York City (NYC) has the fourth worst traffic and first most airport delays in the country. The distribution of these delays is shown in Figure 1. On average per in NYC, weather related delays occur annually on 145 days due to precipitation, 155 days due to fog, 95 days due to temperature, 105 days due to wind, 90 days due to icing, and 35 days due to lightning. Currently, UAM vehicles are designed to fly during clear and benign weather which leaves significant room for design improvements to enable weather tolerant operations.

Team StratosFleet is pleased to propose the Stratos, an all-electric, vertical take-off and landing, completely autonomous aircraft capable of carrying up to four passengers a range of 60 miles for weather tolerant operations in the NYC area. The Stratos aircraft, shown in the Figure at the end of this Executive Summary, features systems designed at improving weather tolerance that include a designated Radar system, a stability augmentation system, a lightning dispersal system, aggressive wing, propeller, and body heating for deicing and anti-icing, a hydrophobic coating, turbulence mapping, and a battery cooling system. Out of the year, Stratos aircrafts will only be negatively affected by weather ten days for wind, five days for icing, two days for temperature, and not at all for precipitation, fog, and lightning, so Stratos aircraft will fly when other aircraft are grounded.

The StratosFleet business analysis indicates that once aircraft are operational by 2030, the addition of the weather tolerant systems will lead to an annual savings of 26% or 1.2 million dollars over other non-weather tolerant urban air mobility vehicles.

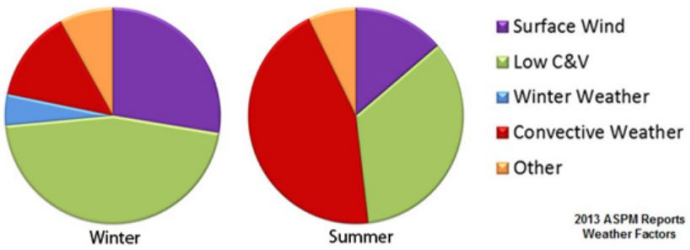

Figure 1: LaGuardia causes for weather delays by percentage. [1]

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The team has designed an ideal mission for moving people around in NYC and compliance with these mission requirements is shown in Table 1.

Table 1: The compliance matrix show that the aircraft meets all the mission requirements derived from the RFP.

Compliance Matrix		
Parameter	**Mission Requirement derived from RFP**	**StratosFleet**
General		
Num. Of Occupants	Optional	4
Autonomous Flight	Optional	Yes
EIS	Optional	2028
Performance		
Avg Speed [*mph*]	150	150
Vertical flight RoC [*ft/min*]	500	500
Horizontal flight RoC [*ft/min*]	900	900
Range [*mile*]	60	66
Max. Speed. Alt [*ft*]	2200 - 2800	2500
Battery Energy Density [*Wh/kg*]	200-400	282
Cruising Alt. [*ft*]	2200 - 2800	2500
Weather Requirements		
Weather and obstacle detection system	Vehicle must be able to detect and avoid obstacles	Yes
Stability augmentation system	Vehicle must remain stable in inclement weather	Yes
Lightning dispersal system	Vehicle must have protection from lightning strikes	Yes
Wing, propeller, and body heating system	Vehicle must be able to fly in icing conditions	Yes
De-icing system	Vehicle must be able to fly in icing conditions	Yes
Weather mapping	Vehicle must have comprehensive weather mapping	Yes
Battery cooling system	Batteries must be able to operate in higher temperatures	Yes