

SUMMARY OF MASTER'S DISSERTATION

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<p>Title</p> <p style="text-align: center;">Cost Analysis of eVTOL Configuration Design for Air Ambulance in Japan</p>			
<p>Abstract</p> <p>An electric vertical take-off and landing (or eVTOL) aircraft is being contemplated its usage widely for air taxi, due to its promising small, low-cost, and low-noise characteristics. There is an opportunity for its use in the medical field due to the high-cost problem of the helicopter. An interview was conducted at Hokusoh hospital, Japan, for the mission profile. Due to battery technology limitations, the new air ambulance, delivering a doctor to patient, will have a concept of 2 passengers, including a pilot and a doctor. The configurations of eVTOL are studied with a fixed wing and a multi-copter. The purpose of this study is to develop a cost model of the new air ambulance using a combination of 3 approaches: top-down, bottom-up, and parametric equation, which is expected to have lower costs than Japan's government budget. The cost model is then constructed for analysis of the production cost of each type, broken down into capital expense and direct operating cost. The result has shown that the multi-copter's production cost works out to be lower at 26.7 million yen for 60-unit production while fixed wing is higher at 80.4 million yen. The direct operating cost of fixed wing at high flight hours is 58 million yen while the multi-copter is lower at 32.3 million yen. Scenarios analysis shows a result that, for different battery costs (200\$/kWh, 176\$/kWh, 100\$/kWh, 62\$/kWh), it has a significant difference in the costs in the years 2020 and 2030 due to the high cost of battery replacement.</p>			
<p>Key Word (5 words)</p> <p>Cost Estimation, Configuration Design, Flying vehicle, Demand, Economy of scale</p>			