

SUMMARY OF MASTER'S DISSERTATION

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Title Examination of Charging Methods for Flying Cars as a New Means of Medical Emergency Transportation			
Abstract <p>In recent years, research and development and experiments on the implementation of flying cars have become more active. As flying cars become ubiquitous, they are expected to serve as next generation air ambulances for the purpose of medical emergency transportation. Flying cars are expected to solve the problems of current air ambulances, such as restricted take-off and landing locations, high cost, and a shortage of pilots.</p> <p>The purpose of this study is to examine the charging methods for flying cars as a new means of medical emergency transportation and define the future challenges of flying cars.</p> <p>First, based on actual operational information from current air ambulances, the practical implications of flying cars were examined. Specifically, the opportunity loss rate for multiple dispatch requests was studied by comparing fast charge and battery swap (Examination 1). Fast charge showed a higher opportunity loss rate than battery swap. Second, based on dispatch request frequency and flight distance data from actual air ambulance operations, fast charge and battery swap were compared, and the requirements for flying cars were established (Examination 2). A flying car with a long cruising range and fast charging ability was shown to be functionally suitable as an alternative to an air ambulance. Finally, based on the results obtained from Examination 1 and 2, from existing flying car models, models that could meet the requirements for an alternative to the air ambulance were determined, and future challenges were identified (Examination 3). Among existing models, Liliium Jet of Liliium and S-A1 of Hyundai and Uber, are suitable from the perspective of charging method, but they do not meet the requirements for next generation air ambulance for their sizes.</p> <p>This study demonstrates that a flying car model that adopts the fast charge method and has a relatively long cruising range is a promising alternative to an air ambulance. For a flying car's airframe, the flying cars without fixed wings is relatively easy to miniaturize, compared to the ones with wings. As the battery performance improves, it is expected that the performance such as cruising range and cruising speed will improve. Therefore, to implement flying cars for the purpose of medical emergency transportation, it is important to improve cruising range and speed in the small sized flying cars with fast charge and without fixed wings.</p>			
Key Word Flying Car, Air Ambulance, Fast Charge, Battery Swap, Opportunity Loss Rate			