

## ABSTRACT

This thesis studies the preparation for the realization of futuristic logistic transportation system based on the technology of Autonomous Aerial Vehicle (AAV) in Indonesia. Traffic congestion, especially in Indonesia, inflicts a serious problem, which cause waste to available resources, such as time and cost. Besides that, Indonesia has not applied state of the art monitoring and management system. To realize a futuristic logistic transportation system, this thesis proposes the use of AAV as the main mode of transportation combined with non-orthogonal multiple access (NOMA) utilising an iterative spatial demapper (ISM).

This thesis proposes the use of the superposition of signals transmitted simultaneously from three separate sources. This thesis uses ISM at the receiver to separate the fused information from three users. The main difficulty of this problem is the complexity of managing a limited resource. This paper uses repetition codes as channel coding and utilises the use of two ISM to improve the signal quality in the network so that order-2 diversity can be achieved. The simulation in this paper is carried out using a computer to determine the performance (bit error rate) (BER) with various parameters that indicate the quality of the network coding.

This thesis has found that ISM is effective in correcting errors due to interference that occurs in the NOMA network, this thesis has also verified the validity of the NOMA network coding using ISM through EXIT chart which based on computer simulations as well as the conformity shown by the trajectories. This thesis is expected to provide a solution to the challenges of massive connectivity.

**Keyword:** unmanned aerial vehicle, non-orthogonal multiple access, network coding, iterative spatial demapper.