

SUMMARY

The study is carried out to overview the possibility and the efficiency of indoor drone application in a laboratory environment which can potentially be extended and applied to the industry.

For the application of indoor drone, key technical features such as gripper system, indoor positioning systems, and vision-based autonomous landing system are reviewed and discussed.

The simulation is carried out to study and analyze the productivity and efficiency of indoor drone operation. The laboratory is modelled based on the actual dimensions and layout in the Visual Components, and a specific task, a lab automation process, is created to produce a part using additive manufacturing and post-processing of the parts.

In the simulation, UAV is used to transport parts continuously between two areas in the laboratory to collaborate with 2 workers assigned to handle the production process at each area. Total 3 simulations are carried out and compared with each other. The comparisons are focused on the number of parts produced and the walking distance of workers.

The simulation results prove that using indoor drone operation for intra-logistics shows far better performance in terms of productivity and saving human resources. When compared between 2 workers with and without UAV, the number of parts produced is improved by 53,3% and the workers' moving distance is reduced by 53,1%.