

## <Group 2> - <A Swarm of Inspection Drones>

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Current manned visual aircraft inspections are time-consuming and expensive, requiring personnel to transport the aircraft to a hangar, construct scaffolding, and perform visual inspection equivalent to 20 man hours. On the other hand, inspection drones do not require a hangar or scaffoldings, and only require the presence of one supervisor: allowing for a drastic reduction in aircraft turnaround time and inspection costs. Drones also have the ability to collect a vast repository of aircraft inspection data in a centralised database, increasing traceability of defects and enable the employment of state-of-the-art predictive maintenance. A *swarm of inspection drones* provides even more benefits; there is no single point of failure, work can be parallelised, and inspection roles can be specialised. Looking further into the future, it might even be possible to have swarms of inspection drones inspect aircraft at the gate during cargo-and-fuel loading.

A swarm of visual inspection drones was selected, offering the best overall performance in terms of (ease of) deployment, cost, scope of inspection, and development risk. The swarm consists of two types of drones; two large drones for upper surface inspection, and three small drones for the bottom surface and hard-to-reach points. This solution reduces the inspection time to 25 minutes for single-aisle aircraft, compared to 8 hours for manned inspection.

The last two weeks of design will focus on finishing and documenting the detailed design, as well as refining manufacturing, financial, and marketing plans. The last steps in detailed design consist of subsystem interfacing and integration, one example being the implementation of software-in-the-loop flight control in the inspection simulation (see Figure 1). Subsequently, risk, sustainability, and requirements compliance will be assessed. Lastly, financial, manufacturing, and operations and logistics plans will be worked out.

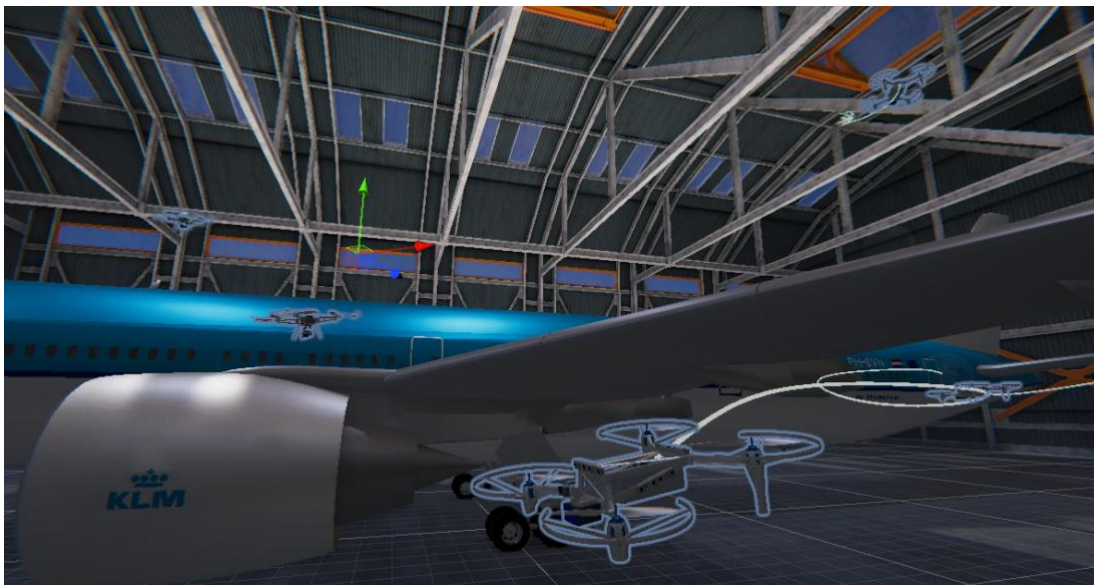


Figure 1 - <The swarm of inspection drones inspecting a KLM Boeing 777-300ER widebody aircraft>