

Master Thesis in Computer Science or Digital Media

Damage Detection on Airplanes via Quadcopters

Background

Aircraft can be damaged in-service (for instance, by ground staff when loading/unloading the aircraft). The airline has to inspect their aircraft for damages. For some areas, for example at the top shell, it is not easy to detect and, in any case, the detection is a time consuming process. The use of a quadcopter or a climbing robot could bring advantages in term of accessibility and time savings. The drone or robot has to be equipped with a device which is able to film/scan/capture damages for subsequent analysis (either by humans or automatically). Damages can be dents, scratches, corrosion, burn marks due to a lightning strike, delamination, etc.

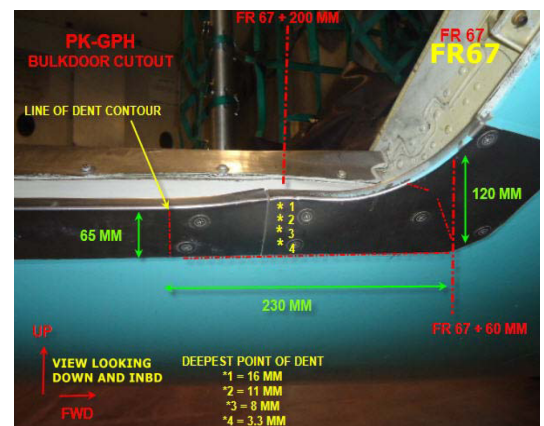


Proposed Tasks for this Thesis

The aim of the project is to develop the concept of a device, which is capable to detect such kinds of damages, and to implement a first prototype. For a lightning strike, a picture from a regular camera (e.g., Alpha Sony 7) can be sufficient. However, it is not capable to capture dents or scratches.

1. Identification of suitable imaging acquisition technology for capturing the damage (e.g., depth camera, laser scanner, etc.) that can be mounted on a quadcopter (or any UAV)
2. identification of suitable kinds/models of UAVs (size, payload, remote control, autonomous flight mode, ...)
3. Implementation of a complete system, i.e., hardware and software, that can be controlled by human staff to assess damages on the hull of an airplane
4. Implementation of some basic computer vision and image processing algorithms to process the incoming stream of depth images
5. Evaluation of the complete system regarding future potential in everyday damage assessment, ease-of-use, and future research challenges.

The work will be carried out mostly in Bremen with visits to Airbus, Hamburg, as often as necessary.



Prerequisites

Depending on your intended direction of research and your study program (CS or DM):

- Programming in C++ or any other language suitable for the tasks (above)
- Basic knowledge and experience in image processing
- Nice-to-have are skills in working with hardware (e.g., cameras, controllers, etc.)

Application

Please send your informal application (including a short description of your relevant skills and courses you have taken) to:

Prof. Dr. Gabriel Zachmann, Computer Graphics and Virtual Reality Group, School of computer Science at University of Bremen (<http://cgvr.informatik.uni-bremen.de>) Email: zach@informatik.uni-bremen.de