

Influence of UAV's flight on infrared measurements

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Infrared thermography is used for non-destructive analysis in a wide range of applications. With the development of unmanned aerial vehicles ("drones"), the applications have become even broader. All infrared cameras derive the surface temperature from the measured radiation intensity. For this derivation, different parameters should be set correctly in the camera software. However, are these parameters influenced by the flight of a drone?

In this paper, different parameters are selected that might be subject to change due to variation in the measurement set-up. The engine of a drone heats up during a flight, but is its influence on the air temperature relevant for the surface temperature derivation? And what about deviations due to a higher sensor temperature in the camera? Furthermore, when determining the reflected apparent temperature, what are good procedures to avoid the drone influencing the measurement?

These parameters will be investigated under controlled circumstances in the laboratory. By adding temperature and relative humidity sensors to the drone and the laboratory surroundings, the environmental conditions can be monitored in detail. A wide range of environmental conditions that are relevant to outdoor inspections will be studied. An insulated Pt100 contact temperature sensor will be used for the reference temperature measurements. By comparing these with the infrared measurements, those parameters that have an influence on the resulting surface temperatures can be detected, and the magnitude of this influence estimated. Conclusions will be drawn regarding which parameters are important to monitor for thermographic inspections of drones.

Keywords

compensation parameters, drone inspection, UAV, unmanned aerial vehicle,