Combining a new form of pulsed phase thermography with enhanced image-processing techniques to evaluate the structure integrity of objects made from lightweight material

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In the last few decades infrared thermography evolved from a conceptual experiment to a promising junior technique on research level. Nowadays thermography has many application fields. In the fields of engineering, process control and non-destructive testing of materials are the major applications.

In this contribution, the pulsed phase thermography technique combined with the use of “Discrete Interval Binary Sequences” (abbreviated as DIBS-signal) as an input signal for the heat source is used to localize defects in parts made of composite material and a heat resistant plastic material. The whole concept is developed to be an important asset to investigate the healthiness of structures or objects, which are made of those lightweight materials.

The pulsed phase thermography, abbreviated as PPT, is one of the best up-and-coming active techniques. The use of a DIBS-signal as an input signal for the heat source has been investigated and the impact on the final results compared to the classical pulsed approach, which is the most common approach, will be shown more in depth. Which leads to the fact that the use of a DIBS-signal is a promising technique, due to its higher signal-to-noise ratio. Although there are some minor issues, enhanced image processing techniques will be proposed to solve them and improve the resolution.

**Keywords:** Pulsed phase thermography, composite, image processing, leakage, binary sequences