Ice Detection Setup Using Infrared and Active Heating

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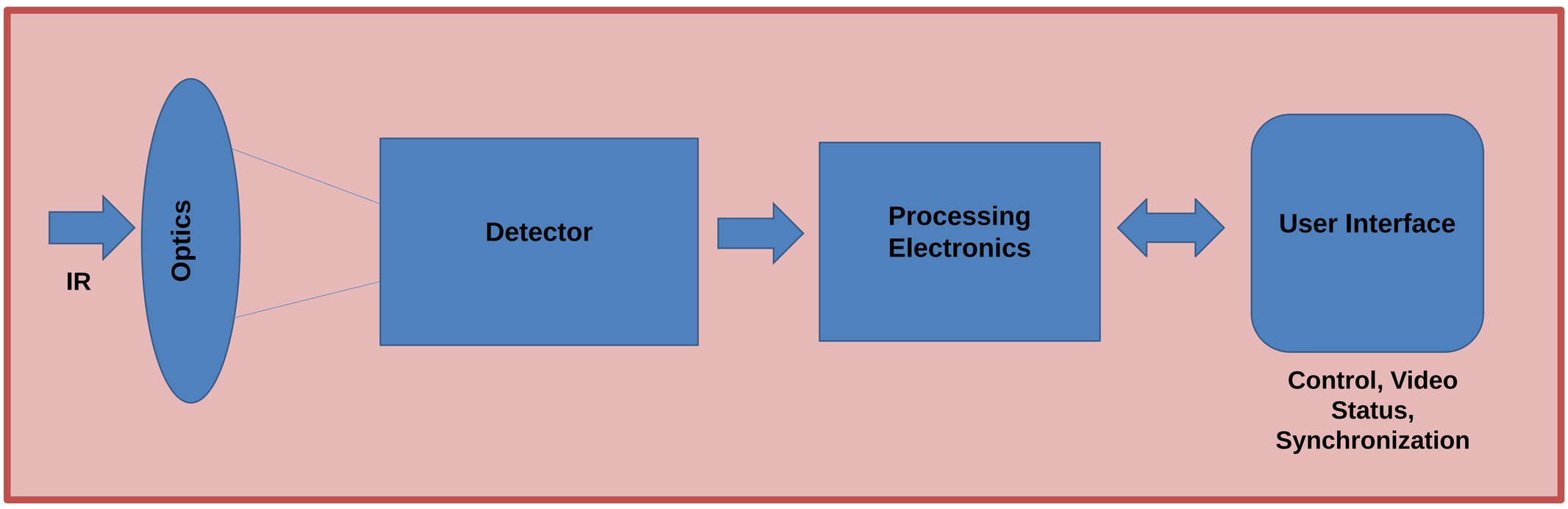
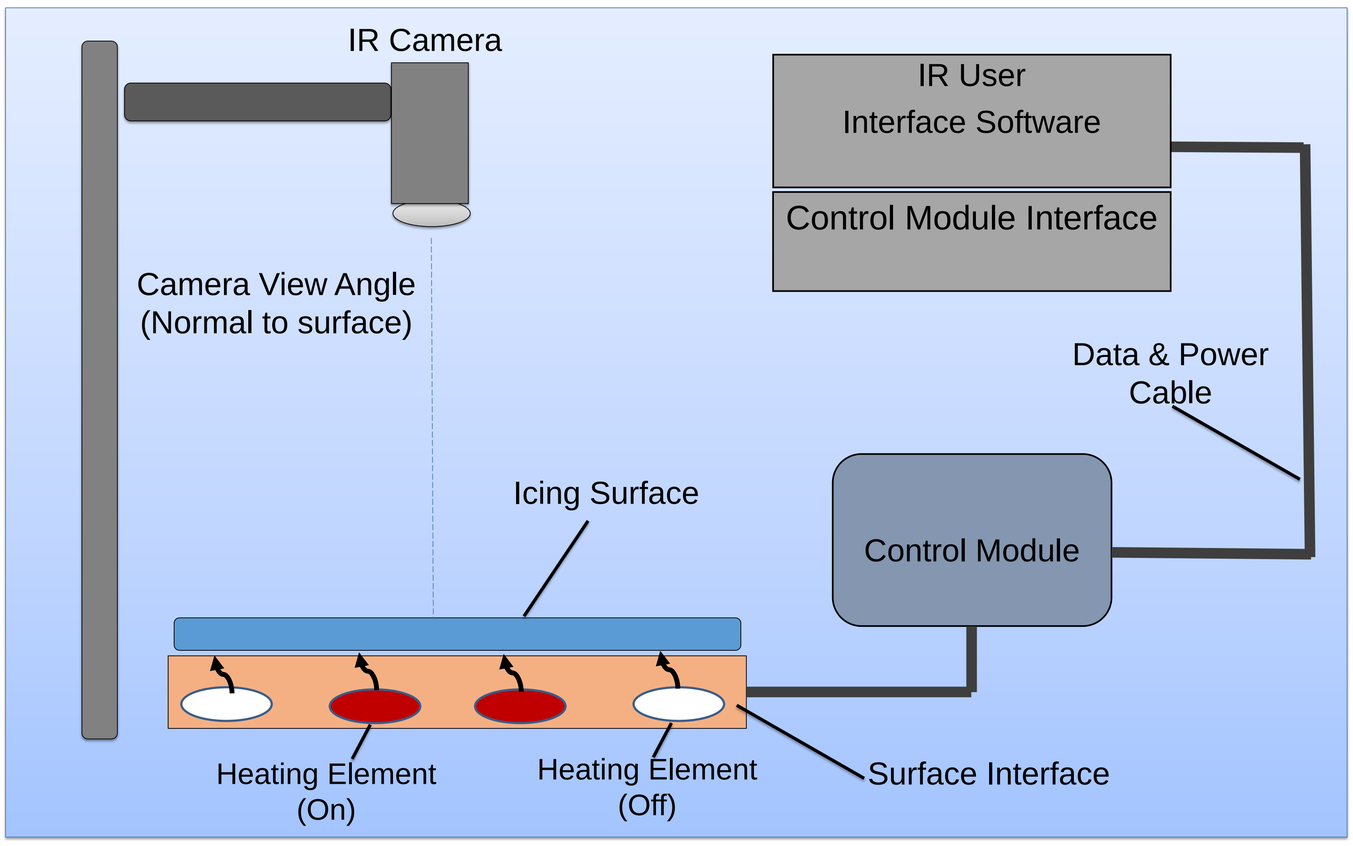
Abstract

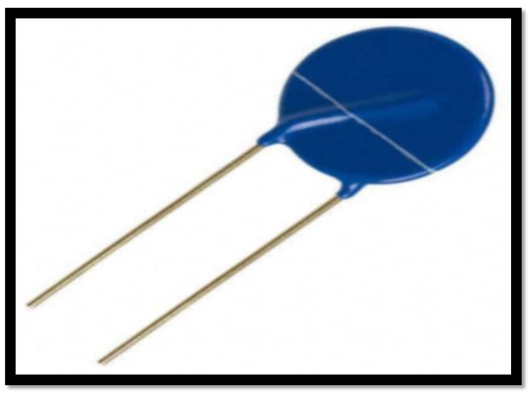
Considering the cold environment operations, ice accretion can occur at a rapid pace and can adversely affect the operations. In such scenario, ice detection is useful for the ice mitigation and removal upon the marine and offshore structures. Various techniques exist in the literature to detect the icing mainly utilizing its physical or electromagnetic properties. The parameters measured by these ice detectors includes its mass, rate and liquid water content.
The paper explains the possible implementation of Infrared (IR) ice detection technique. The experimentation setup is described keeping in view of the marine icing phenomena over the ships and offshore structures. The detection mechanism is unique from the passive IR detection by introducing the active heating concept underneath the observed surface. The intervention of the active heating information inside the IR ice detection system will able to improve the system's detection capability and disseminate the valid information at user interface level. The experimentation setup consists of various components operating at the various level of communication and shows strong cognitive capability contributing towards the outcome of valid ice detection.

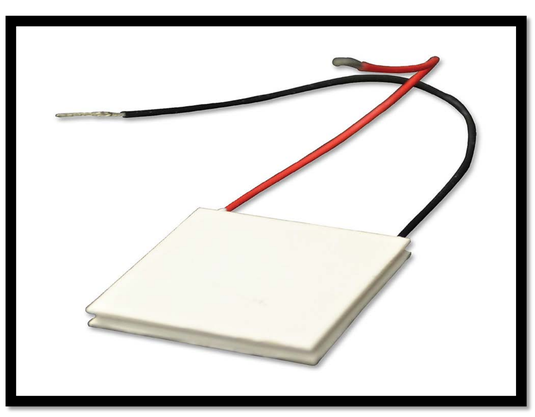
Infrared (IR) Camera Working Principle



Probable Experimental Setup for Infra Red Ice Detection







Heating Elements

Conclusion

The experimentation setup explains the exchange of data in order to acquire valid detection of ice. The introduction of active heating information inside the system can improve the system's capability to detect the icing event in harsh conditions and henceforth help in saving energy required to de-ice.
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