

## CONCEPTUAL DESIGN, SIZING AND THERMAL ANALYSIS OF AN ALERTING SYSTEM FOR MANNED AIRSHIPS

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### Abstract

*This paper describes an automatic and self-contained electromechanical safety system for manned airships, which alerts the flight crew when the temperature at some point over the envelope exceeds a pre-determined safe limit. The system consists of a thin electrical wire that is looped over the airship envelope along its length, which melts at the location(s) at which the safe temperature is exceeded, and sounds an alarm in the crew cabin. A detailed technical description of the alerting system and all its elements is provided, and a methodology for carrying out sizing of the system, and to carry out thermal analysis is outlined. The methodology is used to size the system for an airship of 30 m envelope length cruising at a speed of 20 m/s at an altitude of 10,000 ft. Results indicate that the mass of the system is a small fraction of the force of buoyancy generated by the airship envelope. Thermal analysis indicates that the alerting system is thermally stable, and despite the fact that current is consistently and continuously flowing in the alarming circuit, the wires are not overheated. The system can be of great help in increasing operational safety levels of a manned airship.*

**Keywords:** Lighter-Than-Air Systems, Airships, Safety systems, Alerting system

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