Design of a Ski Lift Inspection and Maintenance System

Katherine Barthelson, Pritika Sondhi, Miguel Mitra, and Shallu Darhele

George Mason University, Fairfax, VA 22030, USA

Corresponding author's Email: kbarthel@gmu.edu

Abstract: Ski lifts transport 51.8 million passengers annually and have increased their operating days from 117 to 204 days on average. However, ski lift inspection frequency has remained constant due to the danger of climbing lift towers. A safer inspection system is needed to increase frequency without increasing cost or risk. This cost-benefit analysis compares the current manual inspection method to two new design alternatives: a stationary tower platform and a mobile aerial platform with HD and thermal cameras for automated image processing. A stochastic simulation was developed to compare system performance. Based on a value hierarchy of personnel safety, accuracy, availability, and inspection time, the utility for each design alternative was calculated: Manual inspection (0.466), tower platform (0.670) and mobile aerial platform (0.691). Based on cost-benefit analysis, it is recommended that ski resorts implement the mobile aerial platform for safer, more frequent, and more accurate ski lift tower inspections.

Keywords: Cost-Benefit Analysis, Unmanned Aerial Vehicles, Ski Lift Inspection