In-Situ Acoustic Measurement of Aircraft Trailing Vortices
WILLIAM DURGIN, REBECCA RODENHISER, HAMID JOHARI, Worcester Polytechnic Institute — Closed path acoustic measurement of circulation, often used in the laboratory environment, has been extended to the airport runway environment. The difference in travel time of sound pulses propagating in opposite directions around a closed path is directly proportional to the circulation enclosed by that path. Apparatus was developed to produce, direct, and measure high frequency acoustic pulses traveling around a triangular closed path which enclosed trailing vortices of light aircraft. The experimental apparatus was installed alongside a runway to measure the strength of trailing vortices as would be produced by aircraft taking off or landing. The measurements clearly show the strength of trailing vortices and their movement out of the measurement zone by mutual induction.