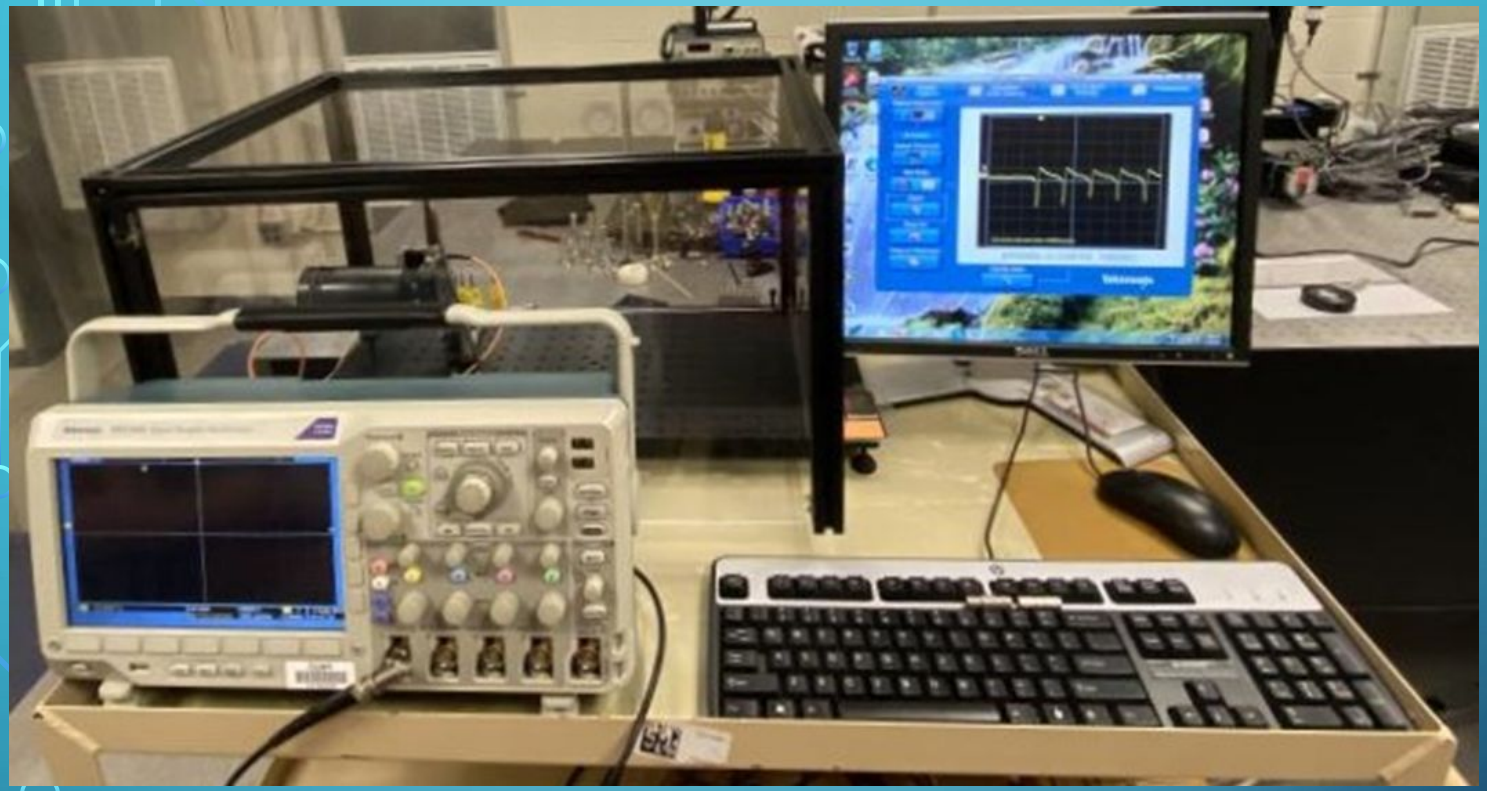
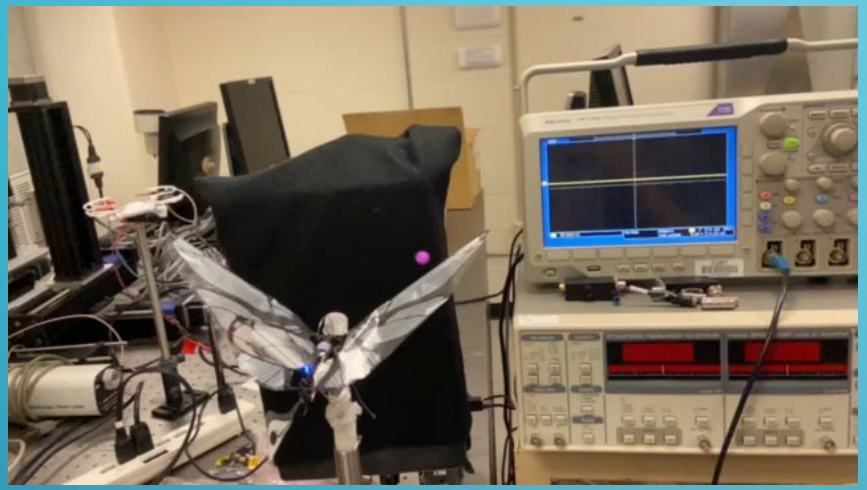


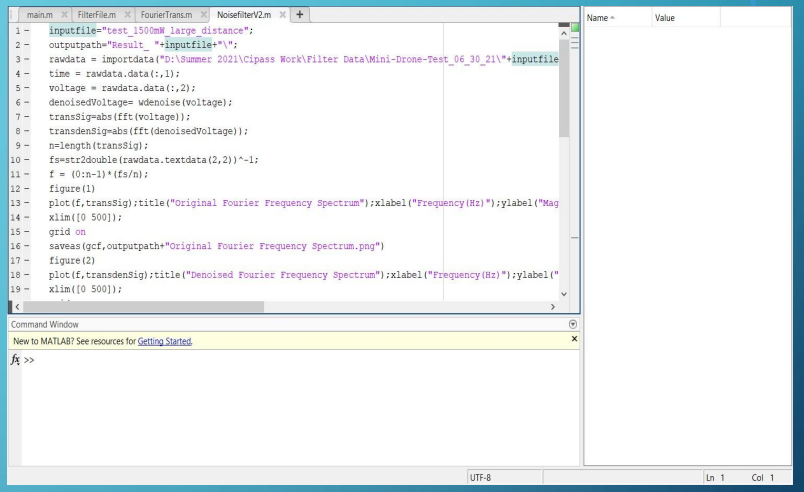
Laser Radar System for Agricultural Applications

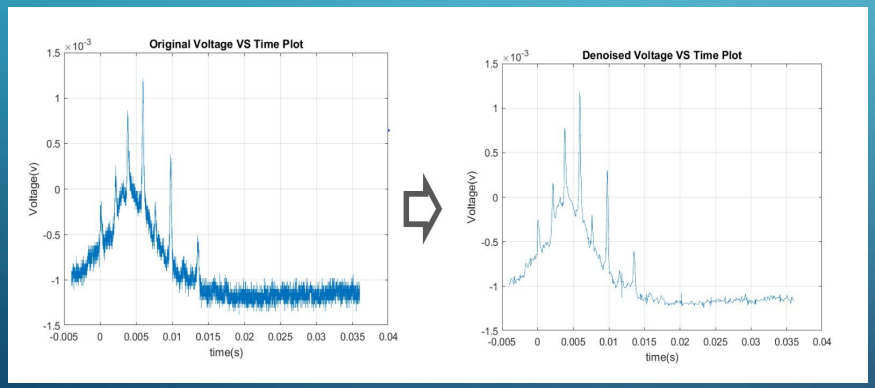
Principle Investigator: Dr. Andrii Golovin (CCNY)
Industry Adviser: Dr. Morann Dagan (Atolla Tech)

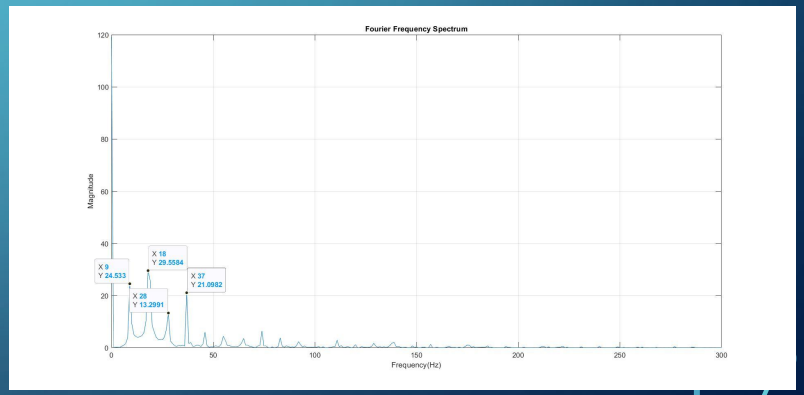
MOTIVATION OF THE PROJECT

LAB EXPERIMENTS









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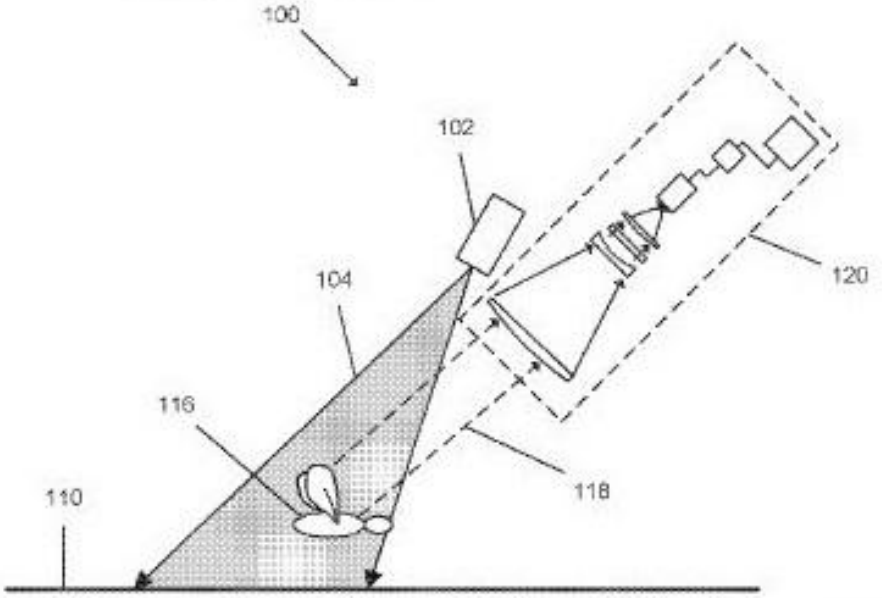
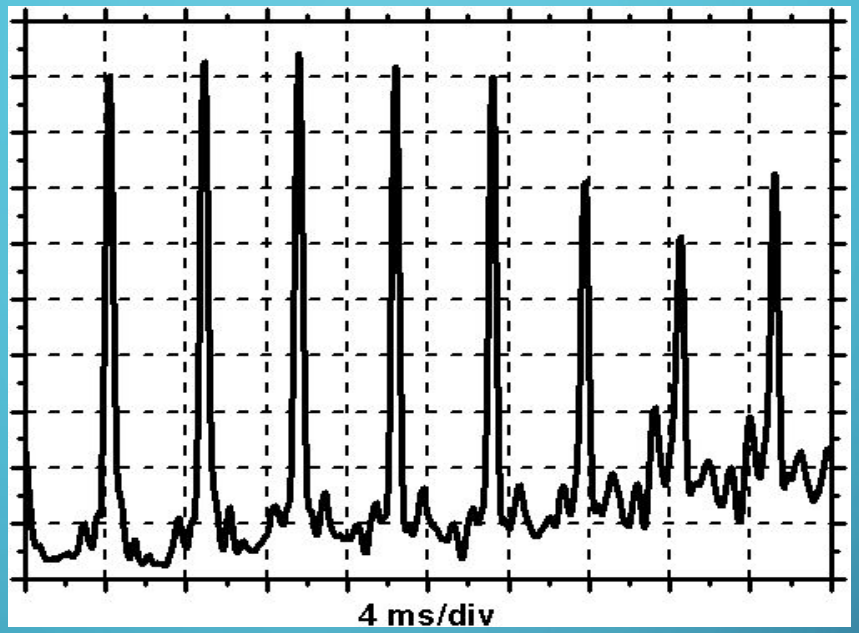
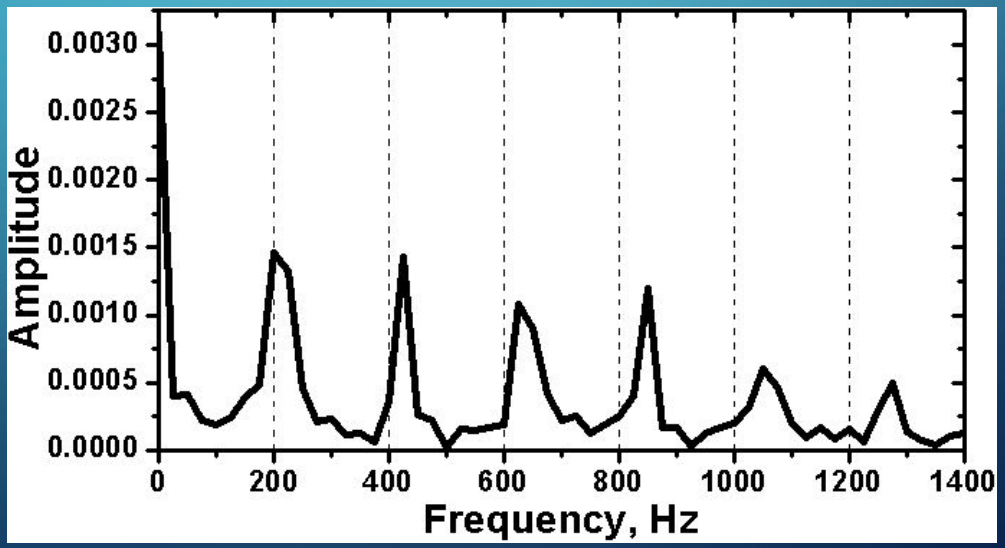
(54) **Title:** APPARATUS AND METHOD TO DETECT AIRBORNE OBJECTS USING WAVEFORM ANALYSIS OF REFLECTED AND SCATTERED ELECTROMAGNETIC RADIATIONS



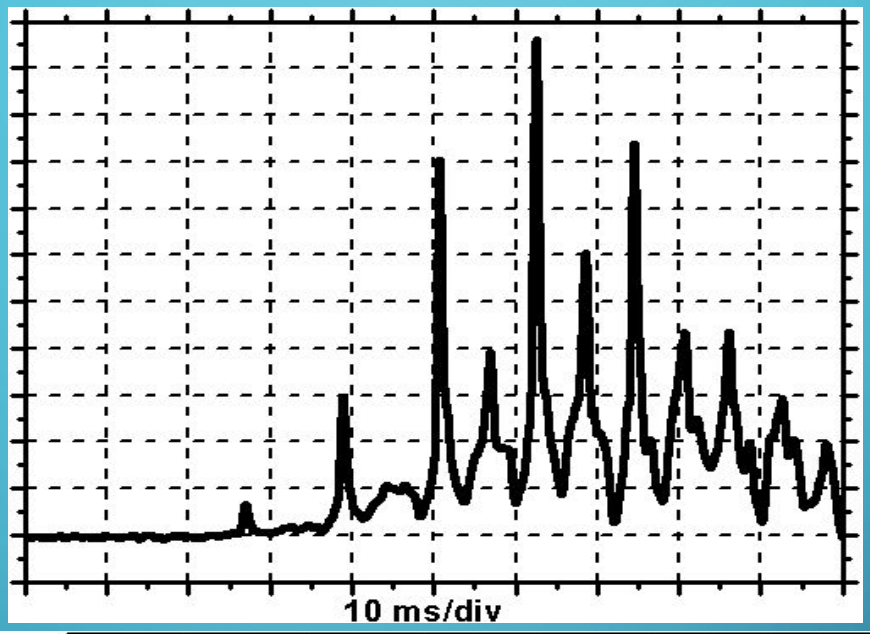
Abstract: A method for detecting an airborne object. Electromagnetic radiation is emitted from a transmitter to overlap with a receiver's field of view. When an airborne object enters the field of view, the electromagnetic radiation interacts with moving airfoils on the airborne object to produce reflected and scattered electromagnetic radiation. The reflected and scattered electromagnetic radiation is analyzed to detect, classify and/or determine the orientation of the airborne object.

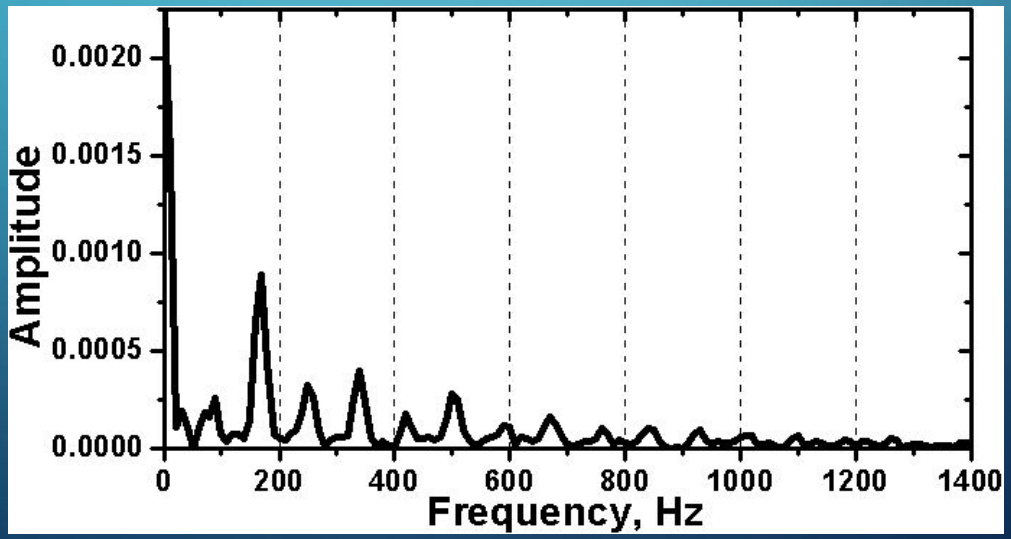
Photodetector signal and Fourier Spectrum measured from a fruit fly.





Photodetector signal and Fourier Spectrum measured from a ladybug.





Project Synopsis

A new laser-radar system for identifying and tracking insects is under development by CCNY's spin-off company Atolla Tech LLC (New York, NY). A team of CCNY students will participate in the development of computer software to provide a waveform analysis of laser radiation backscattered from insects. Students' efforts will be specifically concentrated on the development of a digital filter to reduce a high frequency noise from the signal and to perform a waveform analysis by using Fourier Transformation. Students will develop a user interface, which can be applied to filter the digital signal by using a mathematical approach based on wavelets. This project will allow for the remote identification and tracking of insects over agricultural fields. Learning outcomes for the students will be the experience of performing the work of electrical engineers in the settings of university research lab.