Cal Poly Pomona 3rd Annual Creative Activities & Research Symposium
August 16, 2017
University Library

Oral and Poster Presentations from 9 to 11:15 am
Symposium Reception and Keynote from 11:15 am to 1 pm
Demo Day: Summer Bootcamp Pitches from 1:15 to 3 pm
Poetry Session from 1:15 to 3 pm

Author: Mitchell Caudle

Major:

Project Author(s): Tristan Sherman, Hana Haideri, Jimmy Lopez, Mitchell Caudle

Faculty Mentor(s): Subodh Bhandari

Presentation Type: Poster and Creative Works Showcase (i.e. Poster, Design Project, and/or Prototypes)

Project Title: Autonomous Collision Avoidance of UAVs Utilizing ADS-B Transponders

Abstract: If UAVs are to be successfully integrated into U.S. national airspace, the ability to perform autonomous collision avoidance between both manned and unmanned aircraft is a necessity. This poster presents a method for collision avoidance utilizing Automatic Dependent Surveillance - Broadcast (ADS-B) transponders which will be required in all manned aircraft by 2020. These devices broadcast and receive global position of all similarly equipped aircraft in a 100-nautical mile vicinity. A Sig Kadet Senior and a Hangar 9 Valiant fixed wing aircraft are used as flight platforms to test autonomous collision avoidance. These aircraft will include ADS-B transponders, a Pixhawk autopilot and an Intel NUC as the primary components of the avionics system. The uniquely developed algorithm is compiled in a Linux environment and uses MAVLink protocols to send off-board commands to the autopilot. The collision avoidance algorithm uses kinematic and circular motion equations to predict the future positions of both aircraft and employ an avoidance maneuver at a constant altitude. This system is demonstrated through simple ground tests, and subsequently moving on to full-system flight tests.