Engineering and Physical Science

VCU Innovation Gateway
Office of Research and Innovation

Underslung load stabilization

Stabilizing underslung loads for unmanned aerial vehicle delivery

The use of unmanned aerial vehicles (UAV) has seen a rapid increase in recent years such as in the filming and shipping industries; The ability to capture footage from heights/angles without requiring high rigid structures or expensive manned aircrafts, or to deliver goods quickly and in rural or potentially adverse areas represent just a few of the potential uses of UAVs. A challenge to these applications of UAVs however, is the stabilization of objects that hang from the aircraft that may be subject to pendulum-like oscillations due to wind and other disruptions during flight. In order to expand the range of applications for underslung-load carrying UAVs, autonomous stabilization methods are required.

The technology

Researchers at VCU have developed a device composed of hardware and software to stabilize underslung-carrying loads during UAV flight and during package loading and unloading. The first challenge is addressed by a two-axis angle sensor that determines the direction of the swinging load whereby load stabilization software can maneuver the aircraft to follow in the same direction. This ensures the reduction of swing by positioning the aircraft above the load at all times. The second aspect is addressed by the addition of a strain gauge to detect loading and unloading, paired with a mode switching software module. This component helps stabilize the aircraft between the loading/unloading of underslung objects. Similar technologies exist for manned aircrafts (i.e. helicopters), but require extensive user training to adjust for the swinging trajectory of a load.

Benefits

- Control of underslung loads during UAV flight
- Autonomous stabilization without input from a human user

Applications

- UAV delivery of more fragile and/or sensitive objects
- UAV delivery of larger dimension objects by removing them from proximity of the blades
- UAV stabilization during loading/unloading conditions

Patent status:
Patent pending: U.S. and foreign rights are available.

License status:
This technology is available for licensing to industry for further development and commercialization.

Category:
Electrical and Computer Engineering

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19-092

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