



NYU



AutoCharge: Fully Autonomous, High-efficiency Charging for Quadcopters and Other Autonomous Vehicles

Unmet Need

There is a significant need for technologies that can extend the flight time of quadrotors and other aerial robots, particularly for long-distance missions and applications that require long-endurance autonomy. The limited battery endurance of these robots is a major constraint that limits their usefulness in certain scenarios.

Technology

AutoCharge is a new technology that aims to address this unmet need by providing an efficient, portable, universal, and robust charging solution for quadrotors. The system consists of a portable ground station and a flexible, lightweight charging tether, and a magnetic docking connector that is agnostic to orientation. The ground station also includes an electromagnet that increases tolerance to localization and control errors during docking, while still enabling smooth un-docking once charging is complete.

One of the key features of AutoCharge is its efficiency. By utilizing direct contact charging through the circular magnetic connectors, the system ensures low impedance and high electrical efficiency during charging unlike wireless charging.

The Autocharge ground Station is also highly portable. It is easy to transport and set up in different locations, making it suitable for a wide range of applications. This is particularly useful for quadrotors and other aerial robots that may be used in different scenarios or locations.

AutoCharge has been successfully demonstrated in a 10-hour perpetual flight test, in which the docking and un-docking performance was found to be consistently repeatable. This makes it a reliable solution for long-endurance autonomy and long-range operations, particularly in the case of aerial robots like quadrotors.

Advantages

- Autonomous charging with no user intervention required
- Highly efficient charging with far less loss than a wireless charging solution
- Adaptable system can be used with any connection type
- System is highly robust and portable making it suitable for use in the field

IP Status

Provisional patent application pending

Category

Engineering & Physical Sciences/Robotics
Engineering & Physical Sciences/Transportation

Authors

Giuseppe Loianno, PhD

Learn more

