

Research on Aerial Autonomous Docking and Landing Technology of Dual Multi-rotor UAV

WANG LIANG¹, Xiangqian Jiang², Di Wang², Lisheng Wang², and Zhijun Tu²

¹Shanghai Institute of Astronautical Systems Engineering

²Shanghai Aerospace Systems Engineering Institute

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Abstract

This study conducted an in-depth investigation of the tracking controller of an aerial autonomous docking and landing trajectory system. To examine the system's overall design, a dual-machine trajectory-tracking control simulation platform was created via MATLAB Simulink. Then, an autonomous docking and landing trajectory-tracking controller based on backpropagation proportional-integral-derivative control was designed, which fulfilled the trajectory-tracking control requirements in the autonomous docking and landing process by efficiently suppressing the external airflow disturbance according to the simulation results. A YOLOv3-based vision pilot system was designed to calibrate the rate of the aerial docking and landing position to eight frame per second. The feasibility of the multi-rotor aerial autonomous docking and landing system was verified using prototype flight tests during the day and at night.

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