

FND: Unifying standard physics-based control with learning-based perception and action to enable safe and agile object manipulation using unmanned aerial vehicles

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JHU AirGripper performing package sorting



environmental sensor placement



vehicle for larger payloads

Applications

- warehouse / factory automation
- infrastructure maintenance
- agriculture

Challenge

- contacts, compliance, occlusions, and dynamic environments
- high agility and safety
- assured performance

Solution

- unified standard physics-based and learning-based control
- control policy encodes rich visual and force sensing
- approximately-correct safety through domain randomization

Impact

- computational theory to enable agile and safe robot control
- algorithms that generalize to many complex autonomous systems
- (WISE) women in science and engineering high-school program