



# HONEYWELL PARTNERS WITH NATIONAL RENEWABLE ENERGY LAB ON HYDROGEN FUEL STORAGE

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**Honeywell has partnered with the U.S. Department of Energy National Renewable Energy Laboratory on a year-long collaboration to prototype and support the commercialization of a cartridge-based hydrogen fuel storage solution for UAVs. Honeywell will provide technological expertise, testing for fuel cartridge technology, supply chain support, prototyping and fuel cell evaluation to qualify for the "Fuel Additives for Solid Hydrogen Carriers in Electric Aviation" project. The FLASH project will mature a new hydrogen carrier technology developed at NREL as part of the Hydrogen Materials Advanced Research Consortium project. The program is funded by a partnership of the DOE's Hydrogen and Fuel Cell Technologies Office, NREL, and Honeywell.**

Electric UAVs are seeing rapid adoption in industrial applications such as surveying, infrastructure inspection and security. Many of these applications previously required inefficient ground-based vehicles or hazardous use of piloted helicopters. For short-range applications, UAVs have the potential to offer greater efficiency, reliability and precision compared with conventional combustion-driven aircraft. For long-range and heavy-payload applications, however, battery-powered electric UAVs today fall short. The NREL and Honeywell collaboration seeks to prove that hydrogen can help address these longer-duration, high-payload challenges.

Katherine Hurst, NREL senior scientist and group manager, commented: "Today's long-range

drones are typically powered by internal combustion engines. While they provide the required range that battery-powered electric UAVs lack, these engines have issues with excessive noise, vibration and emissions, including carbon emissions. This is an exciting opportunity to demonstrate the performance of hydrogen storage materials that we developed in our laboratory together with Honeywell to fuel a real-life flying vehicle."

Steve Christensen, one of the NREL leads on the project proposal, said: "This is a dream project for a national lab researcher. Honeywell has already built and tested devices that can use our materials, giving us the chance to drop our technology directly into their systems and move this promising drone fuel toward commercialization through collaborative research and development. We and our partners at DOE are very excited at this opportunity to see DOE's support of hydrogen technologies result in a market application."

"This partnership with NREL is the latest example of how Honeywell is driving the future of sustainable aviation," said Dave Shilliday, vice president and general manager, Urban Air Mobility and Uncrewed Aerial Systems, Honeywell Aerospace. "Hydrogen can offer significant advantages for electric vertical take-off and landing systems in terms of endurance and range. Additionally, using hydrogen as a power source can also significantly expand the possibilities of UAVs beyond the limitations posed by battery-electric powertrains. Honeywell will work with NREL to develop the necessary hydrogen-related technology to contribute to the further growth of the industry."

The FLASH project seeks to deliver an alternative approach in which efficient and long-lasting hydrogen storage is coupled to a fuel cell that converts hydrogen to electricity to power electric UAV flight. The resulting system will enable long-range flights, but without the noise and tail-pipe emissions of combustion engines. It will also enable sensitive drone applications like atmospheric monitoring, where exhaust gases and rumbling engines would reduce performance.

The FLASH project is focused on a solid material that can rapidly release hydrogen gas for use by the fuel cell. The material has a high hydrogen capacity and can operate at low temperatures (approximately 100°C). This class of materials is highly versatile to industrial hydrogen delivery requirements.

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