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Tool for Rapidly Generating a CFD Zone Around a Structure for UAS Inspections

AR tool visualizing hazardous wind flows to improve safety of drone inspections.

Researchers at Purdue University have developed a tool to rapidly generate augmented reality (AR) wind visualizations around structures for Unmanned Aerial Systems (UAS) operators. As the use of drones and UAS becomes increasingly common for structural inspections, this technology guides drone operators through the potentially hazardous wind patterns caused by the geometry of buildings or bridges. Purdue's approach uses computational fluid dynamics (CFD) to model airflow around each geometric subcomponent of a structure to create a composite view of the wind velocity and shear in the area. This technology can reduce the hazard of drone flights and make UAS operation more accessible.

Technology Validation: This technology has been validated through the generation of CFD based on geometry from CAD models. The wind velocity and shear fields were displayed using ARKit on a Galaxy S9 smartphone.

Advantages:

-Uses CFD to determine hazardous wind areas around structures

-Generates a visualization of wind velocity and shear

-Aids drone operators in flight through real-time wind patterns

Applications:

-Structural Inspection using UAS

-AR Visualization for UAS operators

-Computational Fluid Dynamics

TRL: 6

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Aerospace & Defense/Autonomous Systems (UAVs & AVs)

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