OPTIMIZING RAPID DAMAGE INVESTIGATIONS WITH 3D SCENE CAPTURES

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Forensic studies of structures damaged by severe windstorms give valuable insights into wind speeds and effective construction techniques as well as assist engineers in accomplishing structural designs that better protect life and property. Structural damage serves as a proxy method for estimating otherwise-unknown tornado wind speeds, whenever the resistance of affected structures can be estimated. If wind speeds are reasonably well known (as with most U.S. landfalling hurricanes), correlation of damage levels and winds speeds facilitates the creation or validation of insurance risk models. Forensic analysis requires significant time and access to critical damage evidence, neither of which may be available to field researchers, especially in remote or rural regions. Remote-sensing technologies (e.g., lidar scanning, unmanned aerial systems, and structure-from-motion) enable the preservation of three-dimensional damage scenes for subsequent detailed forensic analysis; however, field researchers find a significant challenge in determining the optimal use of these advanced technologies. Field investigations of recent severe tornadoes and hurricanes (sponsored by the National Science Foundation RAPID Reconnaissance program) have given our team the opportunity to explore the optimization of these scene-capture platforms to facilitate forensic investigations.

This presentation highlights the optimal use of remote-sensing technologies for recent investigations of structural damage from major tornadoes hurricanes, with the goal of learning from damage.