

# Creating Digital As-Built Models with Drone Images and BIM Speeds Arena Construction

Turner Construction Innovation Award goes to a system creating 4D work-in-progress models from drone images to quickly identify and communicate construction problems

SACRAMENTO KINGS, UNIVERSITY OF ILLINOIS — MARCH 2, 2016



Turner Construction honored a University of Illinois pilot program with its Innovation Award for a system that routinely creates four-dimensional work-in-progress models from drone images to quickly identify and communicate construction problems in a graphic format.

Drones flying the Sacramento Kings' Golden 1 Center arena construction site capture high-resolution work-in-progress video and photos that feed a visual data analytics tool that contractor Turner Construction has recognized with a Turner Innovation Award.

A team from University of Illinois, funded by a nearly \$1 million National Science Foundation Cyber-Physical Systems (CPS) grant, developed predictive visual data analytics tools called "Flying Superintendent" to automate and streamline today's time-consuming practices for monitoring construction progress. The pilot project goal was to use color-coded 3D visual production models generated by the University of Illinois' technology to easily and quickly inform project stakeholders about at-risk locations on a project site. The information allows stakeholders to prioritize problems based on their construction plan, and take corrective actions to improve the reliability of short-term project plans and develop more productive workflows for construction.

The analytic solution combines images and videos taken with camera drones with four-dimensional Building Information Modeling (BIM) to quickly identify and visually communicate performance problems during construction projects via smartphones and tablets to project participants on and off the site.

"Our web-based solution provides real-time visual reporting of work completed using unordered images collected by any device, from drones to commodity phones," said Mani Golparvar-Fard, assistant professor of Civil Engineering at University of Illinois and CEO of Reconstruct. "All personnel, on and off-site, can interact with our 3D visual production models to communicate and analyze work in progress throughout the life of the job. Teams can conduct quality control by comparing as-built models with specifications, and improve safety by having a clear and immediate understanding of potential hazards. The analytics we conduct on these survey-grade 3D visual production models offer construction managers a transparent view into what's happening on site each day, empowering them to improve reliability in short-term plans and eliminate problems before they happen."

Turner implemented the technology as a pilot program during the construction of Golden 1 Center.

"Golden 1 Center will utilize next-generation technology to connect fans and enhance the way they experience basketball games," said Sacramento Kings President Chris Granger. "It's a natural fit for our partners to come together and use technology in revolutionary ways. This drone helped us meet our goals, manage production schedules and costs, and provided a resource that connected our partners like never before."

"The powerful thing about this technology is that it calls attention to elements of construction in our schedule grouped by their location in 3D," said Lincoln Wood, regional manager for virtual design at Turner Construction. "This streamlines the management of our weekly work planning efforts by allowing us to visualize and mitigate potential risks to our schedule before they happen."

