Technology provides real-time, actionable insights to construction project site managers

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Phillip Dunston, a professor of civil engineering and construction engineering and management, from left, and Joseph Louis, a doctoral candidate, conduct research on technology that provides real-time, actionable insights to a construction site manager. The Purdue Research Foundation Office of Technology Commercialization is looking to license the technology. Credit:

Purdue Research Foundation photo

Project managers at construction, mining and agricultural sites could benefit from technology developed by Purdue University civil engineers that could provide a real-time overview and help control cost and time overruns.

Phillip Dunston, professor in Purdue's Lyles School of Civil Engineering, and Joseph Louis, a doctoral candidate, have created technology that provides real-time, actionable insights to a project site manager.

Dunston said large project sites in the construction, mining and agricultural sectors involve operations that are equipment-intensive and performed in evolving outdoor environments that are not amenable to traditional control methods.

"Managers have a lack of technology to provide them with real-time operational status updates about the performance on the site because the resources involved are spread across large areas that require complex collaborations," he said. "This problem could lead to ever-decreasing margins and cost and time overruns."

Dunston and Louis have developed technology that combines sensors at the site and on equipment with an operational model of the project site.

"Our technology puts the sensor data into the context of the operations, which allows the manager to monitor progress; make real-time, data-driven operational decisions; and automate the worksite at an operational level," Louis said. "Traditional software provides managers only a high-level view by specifying what work is to be done, but not how. Our

technology allows for the analysis, monitoring and control of operations. By having the required level of detail in the operational model, it then becomes possible to specify and automate how exactly the work gets done."

Dunston and Louis have developed the core technology, which is being tested in laboratory settings. They are seeking to validate the technology in more realistic testing locations.

"Collaborating with interested industry partners and obtaining additional financial support would greatly help in proving the feasibility and utility of employing our technology to both monitor and control operations, as well as preparing the technology for deployment in the market," Louis said. "We do not foresee the need for federal or state testing given that we anticipate the implementation of our technology using infrastructure that already exists, either in the construction site itself, or in the marketplace."

Dunston said the greatest impact of the real-time operational status technology could be realized in the future when robots and autonomous equipment become used in mainstream life.

"We see our technology playing a vital role in orchestrating multiple heterogeneous autonomous equipment to enable remote operations," he said. "This will have exciting applications in areas such as remote construction and mining, extraterrestrial construction, disaster recovery and military applications."

Provided by Purdue University

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