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19th International Symposium on Automation and Robotics in Construction

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MESSAGE FROM THE ORGANIZERS

Welcome to the 19th International Symposium on Automation and Robotics in Construction. We at the National Institute of Standards and Technology (NIST) are honored to host this prestigious conference and hope that you will find the technical sessions, demonstrations, and after-hours festivities to have made your hip to Gaithersburg, Maryland not only worthwhile, but memorable.

This year the conference has 88 papers from 20 countries. There are nine sessions including conference-traditional topics such as Design and Development of Construction Robotics; Control Systems for Construction Equipment; Construction Process Modeling and Simulation; Automated Inspection and Maintenance Management Systems; Design Practices to Facilitate Construction Automation; and Construction Information Management Systems. NIST has long held the position that to effectively bring automation to the average construction site one had to do three additional things: 1) provide affordable, ubiquitous, and powerful sensors to monitor construction status; 2) to encourage the development of standard protocols for communication of site data to the business managers. foremen, and machines that need the data; and 3) to provide compelling economic evidence to facilities owners and operators that automation is worthwhile: in short that there is a positive return on investment. We are pleased this year to present three sessions aligned with these goals: Advanced Sensing and Imaging Technologies – including LADAR, Photogrammetry, GPS, and 3D Object Recognition; Field Sensor Data and Construction Process Integration Protocols; and Economic Assessment of Automation and Robotics Technologies.

Talking about robotics, automation, autonomy, and tele-operation is one thing; seeing it and getting your hands on it in person is quite a different experience. With that in mind we have set aside a portion of the conference fur a series of live demonstrations that include automated steel frame building construction; autonomous off-road vehicle navigation; tele-operative control of a remote earthmoving machine; 3D interactive visualization of 4D construction simulation; 3D laser radar scanning of construction sites; and wireless ad-hoc networks for authorization, location, and emergency notification of crafts and trades on construction sites. **All** of these live events will take place on the NIST campus.

Many people both within NIST and on the ISARC conference steering committee did an exceptional job of making this conference happen. We would like to especially acknowledge:

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ABSTRACT

This publication is the Proceedings of the 19th International Symposium on Automation and Robotics in Construction (ISARC). The symposium was held at the National Institute **of** Standards and Technology, Gaithersburg, Maryland during 23-25 September *2002*. The Proceedings include the technical program, list of Board of Directors. Message from the Organizers, and the 88 technical papers from 20 countries authored for this international meeting.

The manuscripts were presented during nine Sessions: Construction Information Management Systems; Construction Process Modeling and Simulation; Design Practices to Facilitate Construction Automation; Design and Development of Construction Robotics; Economic Assessment of Automation and Robotics Technologies; Field Sensor Data and Construction Process Integration Protocols; Automated Inspection and Maintenance Management Systems; Control Systems for Construction Equipment; Advanced Sensing and Imaging Technologies.

KEYWORDS: Advanced sensing; automation; construction; construction equipment; construction process integration; control systems; 4D construction simulation; GPS; imaging technologies; information management; inspection; LADAR; robotics; simulation; 3D Object Recognition

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