

# CPS: Medium: Collaborative Research: Infrastructure and Technology Innovations for Medical Device Coordination

Submitted by Insup Lee on Thu, 04/07/2011 - 5:24pm

## Project Details

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<b>Performance Period:</b>	09/15/09 - 08/31/12
<b>Institution(s):</b>	University of Pennsylvania
<b>Sponsor(s):</b>	National Science Foundation
<b>Award Number:</b>	<a href="#">0930647</a>

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**Abstract:** The objective of this research is to develop a framework for the development and deployment of next-generation medical systems consisting of integrated and cooperating medical devices. The approach is to design and implement an open-source medical device coordination framework and a model-based component oriented programming methodology for the device coordination, supported by a formal framework for reasoning about device behaviors and clinical workflows. The intellectual merit of the project lies in the formal foundations of the framework that will enable rapid development, verification, and certification of medical systems and their device components, as well as the clinical scenarios they implement. The model-based approach will supply evidence for the regulatory approval process, while run-time monitoring components embedded into the system will enable "black box" recording capabilities for the forensic analysis of system failures. The open-source distribution of tools supporting the framework will enhance its adoption and technology transfer. A rigorous framework for integrating and coordinating multiple medical devices will enhance the implementation of complicated clinical scenarios and reduce medical errors in the cases that involve such scenarios. Furthermore, it will speed up and simplify the process of regulatory approval for coordination-enabled medical devices, while the formal reasoning framework will improve the confidence in the design process and in the approval decisions. Overall, the framework will help reduce costs and improve the quality of the health care.

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