iPad Mobile Surgical Console

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Background & Motivation

• Multiple computers in surgical OR for configuration
  – Video, lighting, overlays, etc.
• Cluttered space
• Inconvenient operation
  – Mouse & keyboard input
  – Decentralized
• Sterilization concerns
Current Scheme
Project Goals

• Application for centralized control
• GUI for easy systems configuration
• Touchscreen ability - easy to use, easy to clean
• Ultimately, iPad application to control multiple consoles from a mobile unit
Technical Approach

- Cisst library – backbone of entire project
- CMake – compile software onto iPad
- iOS – development platform
- Internet Communications Environment (ICE) – manages connections between computers
- Scenario Manager – controls interactions between components
Future Schema

Scenario Manager
(Device Coordinator)

ICE

Comp. 1
Comp. 2
Comp. 3

iPad
iPad Surgical Console Concept
Integration Challenges

Many technologies

– Compiling the cisst libraries
– CMake: cross platform make
– ICE: Internet Communications Engine

…need to compile on iOS 4
Deliverables

Minimum (develop iPad as dummy console)
- Install VNC
- Develop GUI for Scenario Manager

Expected:
- Compile and build cisst library on iPad using CMake
- Build GUI iPad application

Maximum:
- Clinical runs - Mock OR
- Revisions based on user experience
Milestone 1 – Core Components

• Install CMake
• Compile CISST
• Install ICE
• Documentation for interface between iOS, CISST, and ICE
Milestone 2 – GUI Component

• Become familiar with iOS GUI development
• Build a GUI for the various components
• Code interfaces between GUI and components
• Documentation for GUI design and interfaces
Milestone 3 – Testing

• Test device with EyeRobot
• Revise GUI based on feedback
## Timeline

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<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
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<td>Install Cmake</td>
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<td>Compile CISST</td>
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<td>Install ICE</td>
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<td>iOS Interface Documentation</td>
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<td>Familiarize with iOS Development</td>
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<td>Build GUI for Components</td>
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<tr>
<td>GUI/Components Interface</td>
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<td>GUI Revisions</td>
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<td>Mock OR Testing</td>
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<td>Project Documentation</td>
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Milestone 1 – Yellow
Milestone 2 – Green
Milestone 3 – Red
Management Plan

- Weekly meetings with Balazs
- Task leaders:
  Backend - Jon
  GUI/Frontend - Hanlin
- Mutual collaboration
Dependencies

• Mostly logistical
• What’s already resolved
  • Development platforms running Mac OS X (~$100)
  • iPads (at $499 each) x 2
  • Apple Developer Costs ($99)
• What needs to be resolved
  • Need 1 more Apple Developer Kit ($99)
    • Hopefully resolve by 2/25
    • Not urgent – have one already
• Total ~$1300
References