

iPad Mobile Surgical Console

Hanlin Wan

Jonathan Satria

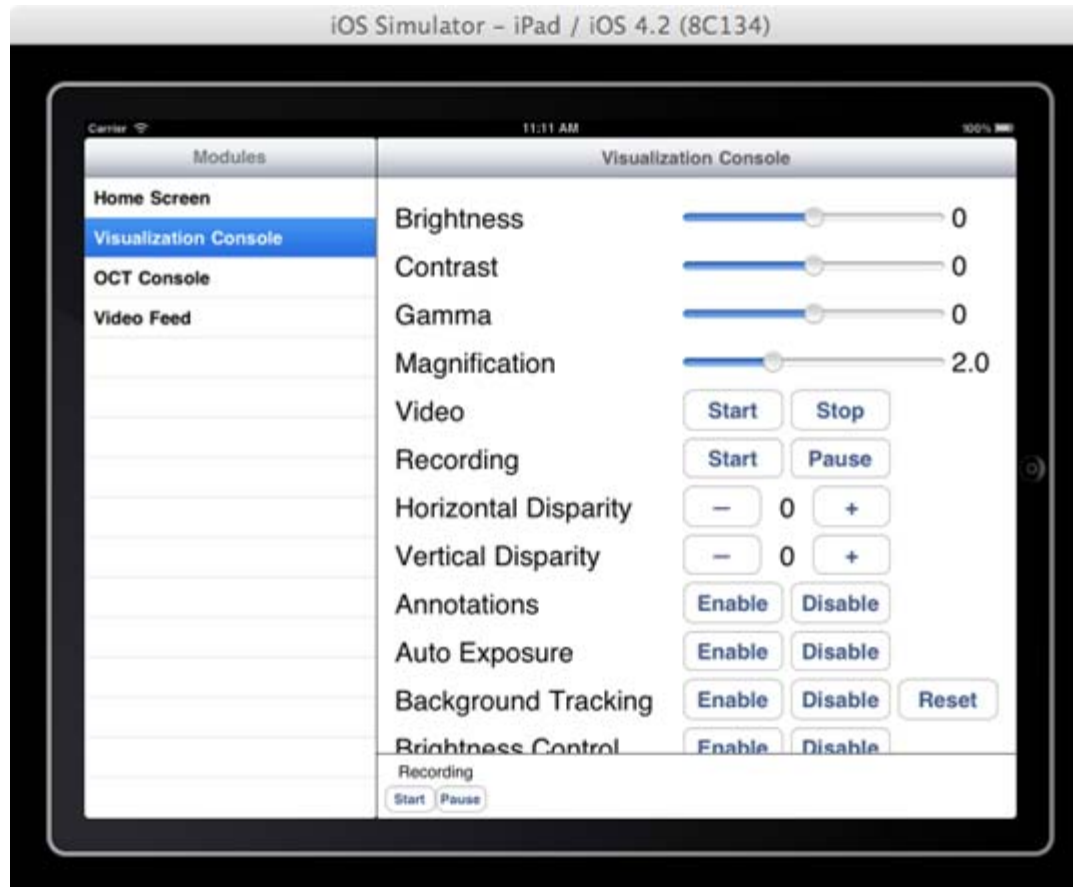
Mentors: Balázs P Vágvolgyi,
Dr. Russell Taylor

Background & Motivation

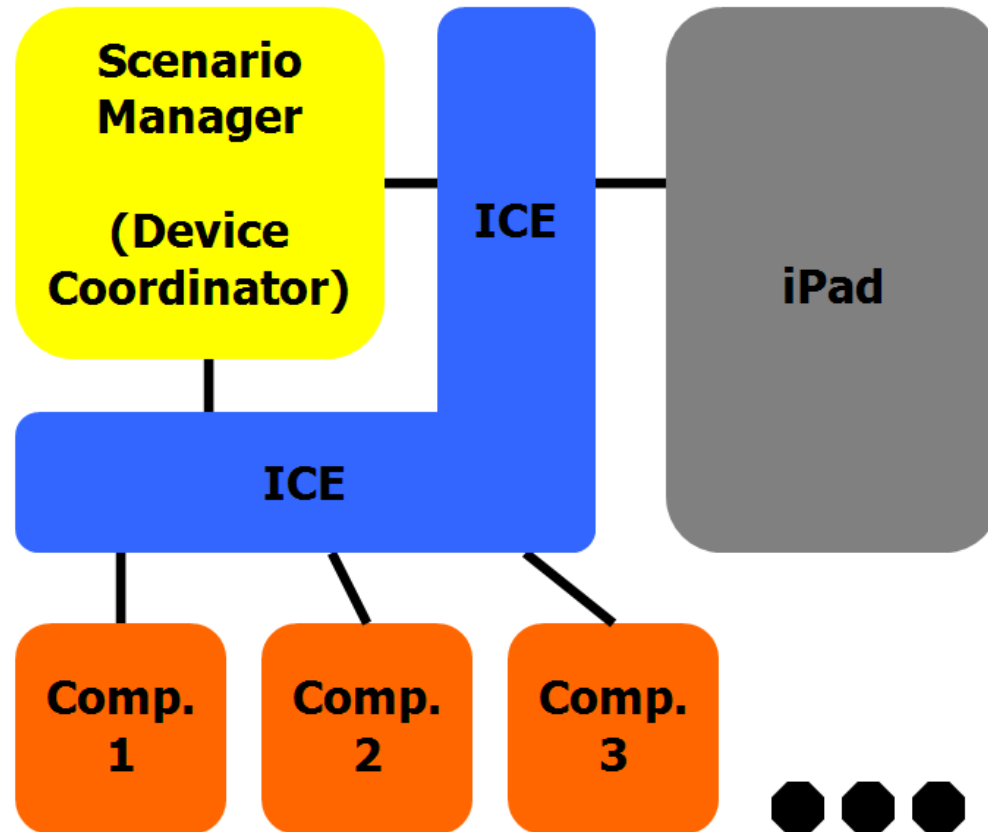
- Multiple computers in surgical OR for configuration of video, lighting, etc.
- Cluttered space
- Inconvenient operation
- Sterilization concerns
- **Solution: iPad application to control multiple consoles from a mobile unit**

```
Terminal - eye@lcsr-microscope: ~/dev/eye-brp/trunk/usrg-draft/build/apps/ScmConsole
File Edit View Terminal Go Help
eye@lcsr-microscope: ~/dev/ci... x eye@lcsr-microscope: ~/dev/e... x eye@lcsr-microscope: ~/dev/e... x eye@lcsr-microscope: ~/dev/e... x
Keyboard shortcuts:
'S' - Start/Stop Video
'1' - Annotations ON/OFF
'2' - Auto Exposure ON/OFF
'3' - Gamma/Brightness/Contrast ON/OFF
'4' - Light Source Compounding ON/OFF
'5' - Image Magnification ON/OFF
'6' - Background Tracking ON/OFF
'7' - Tools ON/OFF
'8' - Registrations ON/OFF
'9' - Painter Display ON/OFF
',' - Gamma Up
';' - Gamma Down
'+' - Brightness Up
';' - Brightness Down
 '[' - Contrast Up
 ']' - Contrast Down
 'z' - Magnify In
 'x' - Magnify Out
 'K' - Disparity Correction Right
 'H' - Disparity Correction Left
 'U' - Disparity Correction Up
 'J' - Disparity Correction Down
 'a' - AScan Display ON/OFF
 'h' - HScan Display ON/OFF
 'c' - Cursor Display ON/OFF
 's' - Video Statistics ON/OFF
 'B' - Background Tracking Display ON/OFF
 'b' - Reset Background Tracking
 'j' - Joystick Display ON/OFF
 '!' - Window Events ON/OFF
 '@' - Joystick Events ON/OFF
 'f' - Force Display ON/OFF
 'F' - Force Bar ON/OFF
 'm' - MScan Display ON/OFF
 'M' - MScan ReviewMode ON/OFF
 'n' - MScan ShowCurrentPath ON/OFF
 'N' - MScan Use Mouse Input ON/OFF
 'Y' - MScan Start
 'y' - MScan Stop
 'l' - Laser Tracking Debug ON/OFF
 'L' - Laser Tracking Reset
 'r' - Start/Pause Video Recording
 'q' - Quit
```

GUI Screenshot



Technical Approach



Deliverables

- **Minimum: (No longer applicable)**
 - Use iPad as a dummy console to VNC into a computer.
 - Create a GUI system to control the multiple components through the Scenario Manager.
- **Expected:**
 - ✓ Compile and build the cisst library on the iPad using CMake.
 - ✓ Build a GUI application for the iPad to control the various components.
 - ✓ Perform clinical tests of the iPad control system in a mock OR setting.
 - Perform revisions to GUI based on user feedback **(in progress)**
 - Detailed tutorial for iOS-cisst interface **(in progress)**
- **Maximum:**
 - Live video display on iPad **(in progress)**
 - Ability to annotate on video feed **(not started)**

Timeline

Ahead of schedule

Task	February		March			April				May		
	1	2	3	4	5	6	7	8	9	10	11	12
✓ Install Cmake	Done				Spring Break							
✓ Compile CISST		Done										
✓ Install ICE			Done									
✓ iOS Interface Documentation			Done									
✓ Familiarize with iOS Development			Done									
✓ Build GUI for Components							Done					
✓ GUI/Components Interface								Done				
GUI Documentation								In Progress				
GUI Revisions											In Progress	
✓ Mock OR Testing												Done

What's Next?

Task	Target Date
Enhanced GUI based on feedback	5/1/11
Tutorial for integration of GUI and component controls on EyeRobot	5/1/11
Add video overlay (and tutorial)	5/8/11
Add ability to annotate on video feed (and tutorial)	5/19/11

Thank You

Questions?