

The Cooper Union

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Mechanical Engineering.

Title: **Robot Control and Communication Interface for the Tele-Robotic Theater.**

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Abstract:

This work describes the creation of a web interfaced robotic multimedia theater (StudioBlue) with funding from the National Science Foundation and the Cooper Union. The project's goal is to establish a common ground for collaboration between art and engineering that will foster an interdisciplinary learning environment for the creation of theatrical performances where the primary performers are robots and the audience is present virtually through Internet audio/video stream. StudioBlue is a laboratory outfitted with theatrical lights, Chromakey equipment, a turntable stage, and a variety of audio and video production equipment as well as a number of ActivMedia robots. This report also presents a communication platform created to enhance the interactivity and the programmability of StudioBlue's robotic actors. The Robot Control and Communication Interface (RCCI) provides a clean and efficient text based robot control interface using the TCP/IP protocol. RCCI was developed in C++ on top of ActivMedia's robot application programming interface (ARIA). Intuitive text commands control major robot functions via *Telnet* operation or software with TCP/IP capabilities. RCCI serves as the robot side control interface for James Cruickshanks' visual robot control software: Graphical Robotic Activity Scripting Platform (GRASP).