Department of Industrial and Materials Science, Chalmers University of Technology
Division: Production Systems

Master Thesis Proposal: Using 3DExperience as a Robot Controler
<u>**Title**</u>

Background
Today 3D robot simulation is a common tool to simulate the program in 3D. This enables a way to analyze the robot behavior without having to run in on the real robot. Sometimes the capability is used to download the program sequence to the robot; whereby the robot can continue working in a factory while its being programmed. The market has started to show interest in going one step further – to actually move the robot as the robot is being simulated. This would enable using the simulation tool as a robot controller controlling the physical robot.

Problem Description
This project will investigate the possibility to control a real robot or an emulated robot, which is a virtual model of the real robot that behaves the same way as the real robot. Emulated robots are sometimes used instead of the simulation model of a robot. The emulated environment is exactly the same as the real robot controller. Chalmers has a very close collaboration with the company Prodtex who supports 3DExperience to Chalmers. Product will supply the necessary tools for this project. This project will investigate three methods to move the robot from 3DExperience:
1. Using an add-on to 3DExperience called ControlBuild, which is developed to deal with Virtual Commissioning. The project will test capabilities to connect to the robot by using C++ API's that sends commands to the robot.
2. Using OPC DA to connect to the robot.
3. A new approach using TCP/IP to connect to the robot.

Suggested Work Process
1. Litterature review to collect the scientific state of the art for using simulation systems to control robots
2. Learn about ControlBuild to communicate with the robot
3. Learn about OPC DA to communicate with the robot
4. Learn about the new TCP/IP connection to the robot
5. Decide if an emulator or a real robot will be used to control
6. Document a step-by-step process to be used in future research at
7.

Links
3DExperience Robotics
ControlBuild to control robots in 3DExperience
OPC DA

Special Requirements: Some programming
Student Background: Thesis project will be examed at IMS
Number of students: 2
Duration: Starting ASAP, 20 weeks
Examiner: Henrik Kihlman, IMS
Supervisor: Henrik Kihlman, henrik.kihlman@chalmers.se