

**Development of Control System for
Virtual Manufacturing System**

THESIS REPORT

**Proposed as one of the requirements to Obtain a Bachelor Degree in
Industrial Engineering**



Created by:

Name : Abiyoga Kristanto

Student number : 07522110

**INTERNATIONAL PROGRAM
DEPARTMENT OF INDUSTRIAL ENGINEERING
FACULTY OF INDUSTRIAL TECHNOLOGY
UNIVERSITAS ISLAM INDONESIA
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Declaration Letter

I declare this research was conducted by myself except several citations that have been mentioned its sources.

Yogyakarta, April 11, 2012

Abiyoga Kristanto

Student ID 07522110

THESIS APPROVAL OF SUPERVISOR

**Development Control System for
Virtual Manufacturing System**

THESIS



By:
Name : Abiyoga Kristanto
Student Number : 07 522 110

Yogyakarta, April , 2012

Approved,

Thesis Supervisor,

A handwritten signature in black ink, appearing to read 'Ridwan', is written over the text 'Thesis Supervisor,'.

(Muhammad Ridwan Andi Purnomo, ST., M.Sc., Ph.D)

THESIS APPROVAL OF EXAMINATION COMMITTEE

**Development Control System for
Virtual Manufacturing System**

Created by

Name : Abiyoga Kristanto

Student number : 07522110

Was defended in Front of Examination Committee

Proposed as one of the requirements to Obtain a Bachelor Degree in
Industrial Engineering

Yogyakarta, April , 2012

Examination committee

Agus Mansur, ST., M.Eng.Sc.

Examination committee Chair

Sri Indrawati, ST., M.Eng.

Member I

Muhammad RidwanAndiPurnomo, ST., M.Sc., Ph.D.

Member II

Accepted By,

Director of International Program

Department of Industrial Engineering

Faculty of industrial Technology

Universitas Islam Indonesia

Muhammad RidwanAndiPurnomo, S.T., M.Sc., Ph.D

Dedication Page

*I dedicated this final project to my Dad,, my Mom,
my Sister and someone who loves me.You are my inspiration.*

MOTTO

“O My Sons! Go you and enquire about Yusuf and his brother, and never give up hope of Allah’s Mercy. Certainly no one despairs of Allah’s Mercy, except the people who disbelieve”

(QS: Yusuf: 87)

Pat your own shoulder and says “it’s not easy but I can do it, success is our right” –
Mario Teguh

“He gives wisdom to anyone He wishes, and anyone He gives wisdom to, receives an abundant boon. Yet only prudent persons will reflect on it.”

(QS: Al – Baqarah 269)

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Authors are aware there are still many shortcomings of this writing, the authors present a huge apology. Hopefully this report can be useful for writers and readers.

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Yogyakarta, April 2012

Abiyoga Kristanto

ABSTRACT

Recently, Virtual Manufacturing (VM) has received great attention from several researchers because of its ability to save the time and cost. In VM, analysis of manufacturing activities are carried out virtually using computer technology so that it can be finished fast. Technically, all of objects in real manufacturing system are modelled virtually in 3D space. Besides, it is need to provide a control system as well in order to move and monitor the virtual objects in 3d environment. The aim of this research is to develop a control system for a VM system. The control system is developed based on inverse kinematic concept and it is instantiated using Microsoft Visual C# technology. A commercial 3D engine, TV3D system is also utilised in order to render the modelled 3D objects. Based on testing using a case study which involves 2 industrial robot arms with 6 degree of freedom, it shows that the developed control system is able to move and monitor the industrial robot arms without any collisions. It can be said fairly that the proposed control system is work well in such case study.

Keywords: Virtual Manufacture, Control Algorithm, Inverse Kinematic, TV3D

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