Real Time Control Seminar

Introduction & Overview

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Business Development Director
Solutions 4 U
What’s in Common?

• Car Auto parking System
• Join Strike Fighter
• Space craft locking Station
• Pick and Place Robot
• Walking and Eating
Answer?

A) All written in English
B) All sentences are more than 2 Words
C) All related to Control Application in 1 way or another
Our Company

Set up in 2007, located at KL, Malaysia.

Distributor of Googoltech, Terasoft, SYSTAT, Neurosolutions, Mototron product in Malaysia and Singapore

Focusing on providing training, product (software/hardware) Solutions to customers.

Main Supplier from US, Hong Kong, India, Taiwan, etc.

Key team members with more than 8-10 years working experience in Software and Hardware environment (such as Matlab, Quanser, Maple, etc..)
Main Control Supplier

- Headquarters. Set up in July 1997, located at HKUST, Hong Kong, 120 Staff.
- Googol SZ, first wholly owned subsidiary, located Hi-Tech Park, Shenzhen, China
- The first company in China and Asian-Pacific area specialized in designing and manufacturing motion controllers
- Focusing on development of motion control technology as their core technology
- Promoting the applications of motion control technology in industrial automation
Today’ Challenges in Control Solutions

• Support Various Discipline (Electrical, Electronics, Mechanical, Aerospace, Automotive Engineering)
• From undergraduate, postgraduate, teaching, research to industry
• Integrate with others domain & Application (Image, control, Signal Processing, Navigation)
• From to provide Modeling, Simulation, rapid prototype to deployment (from Concept to Practical)
• Support multiple software development platform (Matlab, Labview, C++, etc..)
• Quality, Appearance, Reliable, easy to use, flexible, modularity
• Cost effective
• Good documentation & service support
## Googol’s Product Competitive Advantages

| **Technical Strength:** | - Lead by world renowned experts;  
- A comprehensive R&D team; about 40% with Master & PHD  
- Strong technology alliance (academic and industrial) |
|-------------------------|---------------------------------------------------------------|
| **Superior Technology:** | - Integrate DSP & FPGA technology (Fast & cost effective)  
- Open-architecture (Integration of 3rd party software & hardware)  
- Robustness & Industries specification  
- Patent and CE Certificate  
- Modularity in some experiments |
| **Superior Support and Services:** | - OEM design (Hardware, Firmware,...) at lower cost and faster speed & for small scales, Customizable  
- Total system solution  
- Rapid response |
| **Low Cost:** | - Much lower cost compared to competitor, but no compromise in quality and support |
Based on open architectural motion control as the core technology, Googol developed the products family to facilitate the study and research in the area of robotics and automation……
Motion Controller Applications

PCB, CNC, Cutting, Engraving, Scanner, Textile, Printing, Testing …

Over 800 industrial customers Worldwide…

![Graph showing the increase in axes from 2002 to 2008](image)
<table>
<thead>
<tr>
<th>Basic Control Courses</th>
<th>Automation Control</th>
<th>Robotics &amp; Mechatronics</th>
<th>CNC &amp; Production Automation</th>
<th>Electrical &amp; Electronics Engineering</th>
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</thead>
<tbody>
<tr>
<td>Basic Control Courses</td>
<td>AC Servo &amp; linear motion control</td>
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<td>Ball &amp; Beam</td>
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<td><strong>Linear single Stage inverted pendulum</strong></td>
<td><strong>AC Servo and motion module</strong></td>
<td><strong>Linear and Circular single stage inverted pendulum</strong></td>
<td>DSP motor control laboratory experiment platform (basic)</td>
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<td><strong>Circular single stage inverted pendulum</strong></td>
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<td><strong>XY Table</strong></td>
<td><strong>Magnetic Levitation</strong></td>
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<td><strong>Ball &amp; Beam</strong></td>
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<td><strong>3 DOF Helicopter</strong></td>
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<td>Tank Level Process control</td>
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<td><strong>Magnetic Levitation</strong></td>
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<td><strong>Ball &amp; Plate</strong></td>
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<td>Advance Control Courses</td>
<td>Linear 2-Stage inverted pendulum</td>
<td>3-D Linear motion platform</td>
<td>3-D Linear motion platform</td>
<td>DSP motor control laboratory experiment platform (advanced)</td>
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<td><strong>Circular 2-stage inverted pendulum</strong></td>
<td>2 DOF robot arm</td>
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<td><strong>Magnetic Levitation</strong></td>
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<td><strong>Ball &amp; Plate</strong></td>
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<td><strong>3 DOF Helicopter</strong></td>
<td>4-axis motion control</td>
<td>Automatic Storage System</td>
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<td>4 Rotor Hover Vehicle</td>
<td><strong>2D Pan &amp; Tilt</strong></td>
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<td><strong>Ball &amp; Plate</strong></td>
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<td>Control, Robotic &amp; Automation Challenge Design Research</td>
<td><strong>Motion controller cards</strong></td>
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<td>Embedded Motion development platform</td>
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<td>Linear 3 and 4-Stage inverted pendulum</td>
<td>4-6 DOF robot arm</td>
<td>3-D engraving machine</td>
<td><strong>Ball &amp; Plate</strong></td>
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<td><strong>Planar inverted pendulum</strong></td>
<td>High speed, high precision motion platform</td>
<td>4-axis synchronized CNC system</td>
<td><strong>Pan &amp; Tilt Vision System</strong></td>
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<td>Circular 3-stage inverted pendulum</td>
<td>Planar parallel redundant robot arm</td>
<td>Automatic logistic System (ALS)</td>
<td><strong>Self Balancing Robot</strong></td>
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<td><strong>3 DOF Helicopter</strong></td>
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<td><strong>Flexible manufacturing system (FMS)</strong></td>
<td><strong>Automatic Logistics System (ALS)</strong></td>
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<td>4 ~Rotor Hover</td>
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Aerospace example - 3DOF Helicopter

- Helicopter derives its source of lift from the rotor blades rotating around a mast
- Since 400 BC, the Chinese had a bamboo flying top that was used as a children's toy
- In 1493, Leonardo da Vinci first sketched a semi-practical machine, named in his "Codice Atlántico", that could be described as an "aerial screw"

Video

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Magnetic Levitation

Most Popular Application of Magnetic Levitation System in the real world – Maglev Train is a form of transportation that suspends, guides and propels vehicles via electromagnetic force.

Video

http://www.Solutions4u-asia.com

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Control & Vision System

- Pan & Tilt System 2-axis rotation system is applying the principle of Vision with Control
- Used for fundamental motion platform for military and civil instrument such as Radar, Canons and monitoring devices. Useful for target identification, tracking of object in Defense and security application.

[Video]

http://www.Solutions4u-asia.com

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Demo on Single Axis Servo Motor

Experiment Reference:
- Servo Motor Position Control
- Servo Motor Speed Control
- Motion Controller Programming
- System Identification
- Data Acquisition
- Motor Following

Ability to support IPM, ML/SL, Labview, etc..

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Agenda of Later sessions

Session 1:
Overview of Solutions in Control Application
  - Selected video (3-D helicopter, Magnetic Levitation, Pan & Tilt)
  - Single axis DC motor (demo)

Session 2:
Cross Application & Multiple Platform Support in Education Trainer Kit
  - Inverted Pendulum Systems (demo & Video)
  - Ball & Plate Systems (demo)
  - Ball & Beam Systems (demo)

Session 3
R & D Platform - User Stories
  - Self-Balancing Robot (video)

Session 4
Industries Application, Flexible Manufacturing System and Motion Controller
  - XY Table (demo)
  - Robotic Arm (video)
  - FMS and ALS (video)