



**BITS Pilani**  
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# Mechatronics Case Studies

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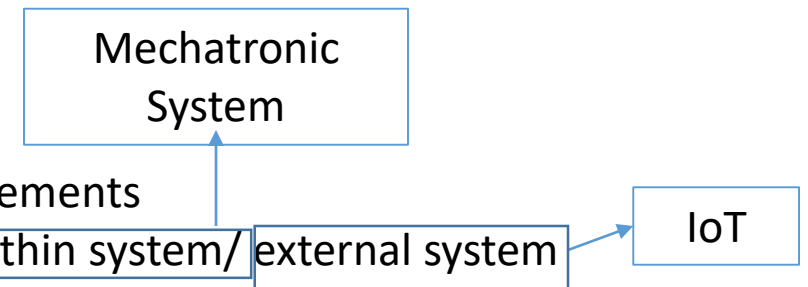
# Mechatronics Literal Introduction

Which is the best mechatronics system in the world? Say some examples



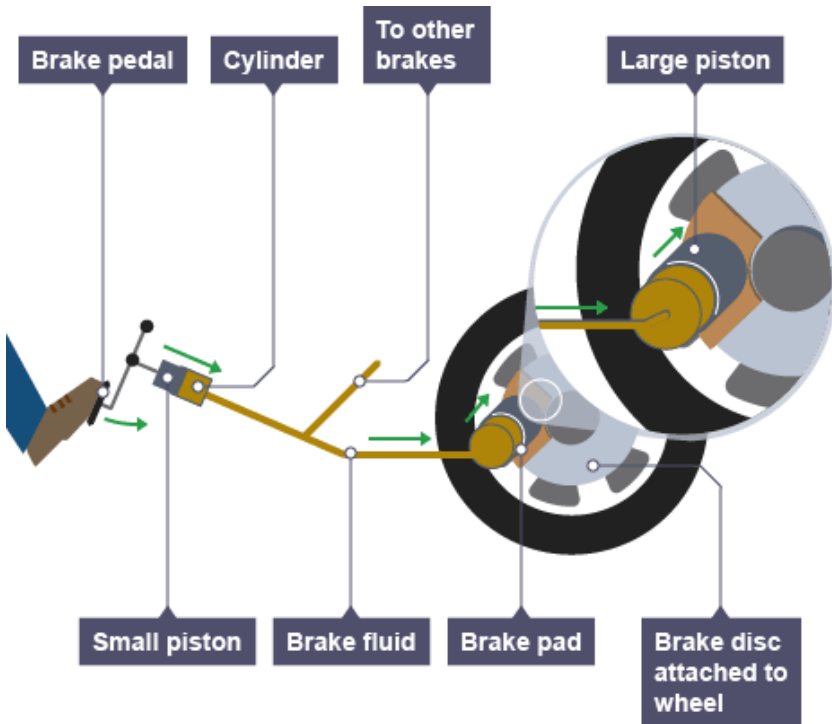
**Humans**

- Humans are the best example of a mechatronics system
  - (technically bio-mechatronics system)
- Has several mechanical links actuated by the brains electronic signals
- Several sensors are controlling the motion of the links using
  - either the program (repeated program or a habit of a human) or the sensor input (from skin, eyes, ears, nose and so on)
- Humans will use vocal for conveying the message to other sensor
- But what is mechatronics:
  - Mechatronics have following sources to actuate any element
    - Hydraulic
    - Pneumatic
    - Electronic
  - Included with sensor elements
    - within element/within system/external system
  - Included with control elements
    - within element / within system / outside the system (local and global)





# Cases



[Image link](#)

Hydraulics Brake



[Image link](#)

Earth movers



[Image link](#)

Slow down the flight and flap control



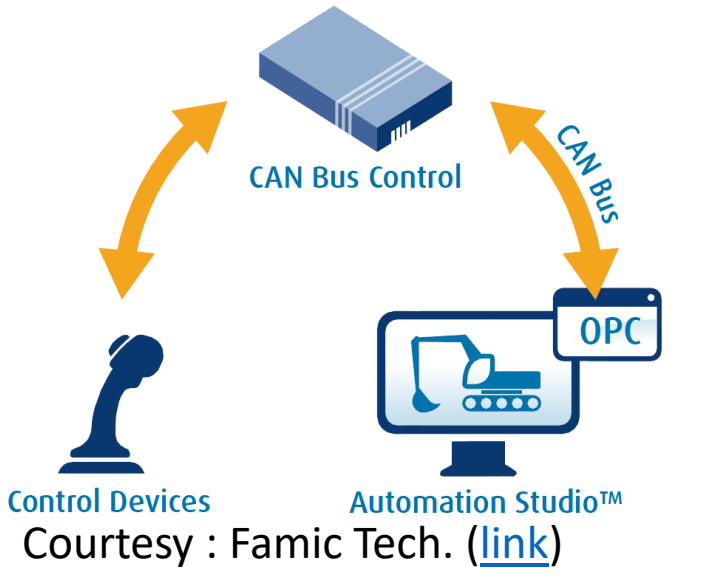
Hydraulics press for metal forming operations [Image link](#)

## WHICH PRESS IS BEST?

Below is a competitive analysis of mechanical, hydraulic, & servo-electric press systems. Consult your application requirements, and choose the press that's best for you!

	 MECHANICAL	 HYDRAULIC	 SERVO-ELECTRIC
High Tonnage Capacity	✓	✓	
High Cycles Per Minute	✓	✓	✓
High Accuracy	✓	✓	✓
Programmable/Adjustable Stroke		✓	✓
Full Tonnage Throughout Stroke		✓	✓
Customizable		✓	✓
Low Acquisition Cost		✓	
Energy Efficient			✓
Low Maintenance			✓
Small Carbon Footprint			✓
Quiet			✓
Built by Beckwood		✓	✓

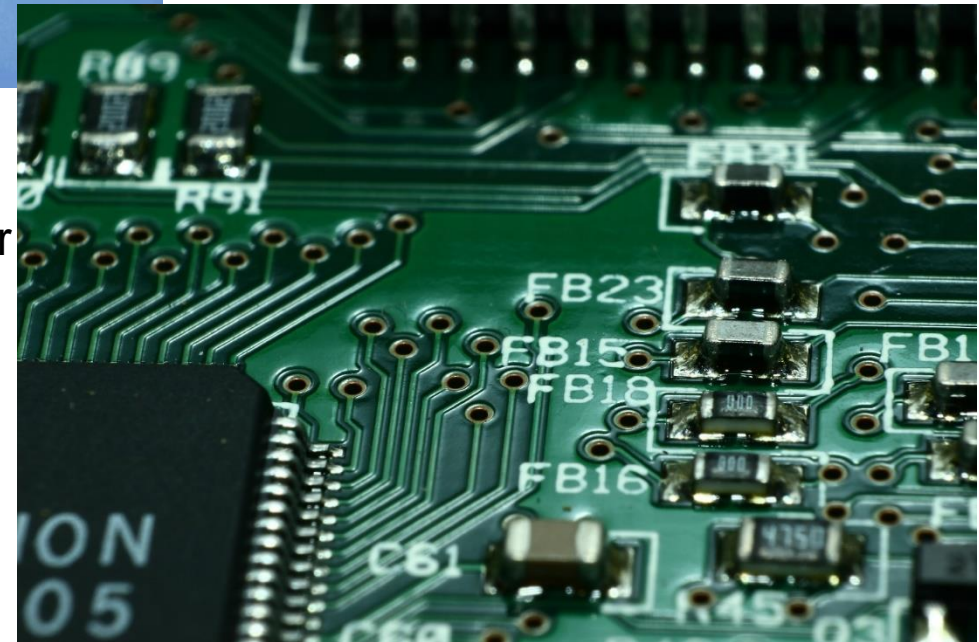
# Cases



Vehicle cruise control is only one of the many applications of DC motor speed control



Pick and place machines for PCB manufacturing are a great example of position control



Courtesy : Quanser ([link](#))

DC motor modeling and control in drones



# Cases



Rexroth's Multi-Product Line brings together hydraulic power units with embedded sensor technology to provide predictive indicators.

The Factory of the Future is Now  
– and it's Everywhere

Robert Rexroth (A Bosch  
company's popular case study)

Watch video for more details:  
<https://www.youtube.com/watch?v=M2q9ILQLbk8&t=4s>

Tech Paper PDF [link](#)

# Sectors serving | Useful links | Industries

## Automation is everywhere

- Agriculture and Forestry
- Aviation
- Community Infrastructure
- Construction
- Data Centers
- Energy
- Government & Military
- Healthcare
- Oil & Gas
- Machine Building
- Manufacturing & Industrial
- Mining, Metals & Minerals
- Pulp and Paper Manufacturing
- Rail
- Residential
- Utility Industry
- Vehicle / Transportation

## Useful links

<https://www.boschrexroth.com/en/us/trends-and-topics/case-studies-tech-papers-and-viewpoints/case-studies/index>

<https://www.boschrexroth.com/en/us/trends-and-topics/case-studies-tech-papers-and-viewpoints/technical-papers/index>

<https://www.boschrexroth.com/en/us/trends-and-topics/case-studies-tech-papers-and-viewpoints/case-studies-archives/index>

<https://www.eaton.com/Eaton/OurCompany/SuccessStories/index.htm>

<https://www.rockwellautomation.com/global/news/case-studies/overview.page?>

## Popular Industries



Courtesy Eaton ([link](#))

Popular industries published in controlglobal.com based on the business during the year 2017-18. Intention is to give insight about the implication of automation in industries, author is not responsible for any wrong information. [link](#)



**Thank you**