

'Cheap & Cheerful' – Demonstrating Control to 1st Year Engineering Students



**Maynooth
University**
National University
of Ireland Maynooth

OVERVIEW:

- Illustrating the concept of system control to Electronic Engineering students is typically achieved through simulation and theory. However, we wanted a hardware demonstration ...
- Existing commercial hardware products are simply too expensive and too bulky to adequately equip a typical undergraduate Engineering hardware-based laboratory ...
- So, we built our own !!

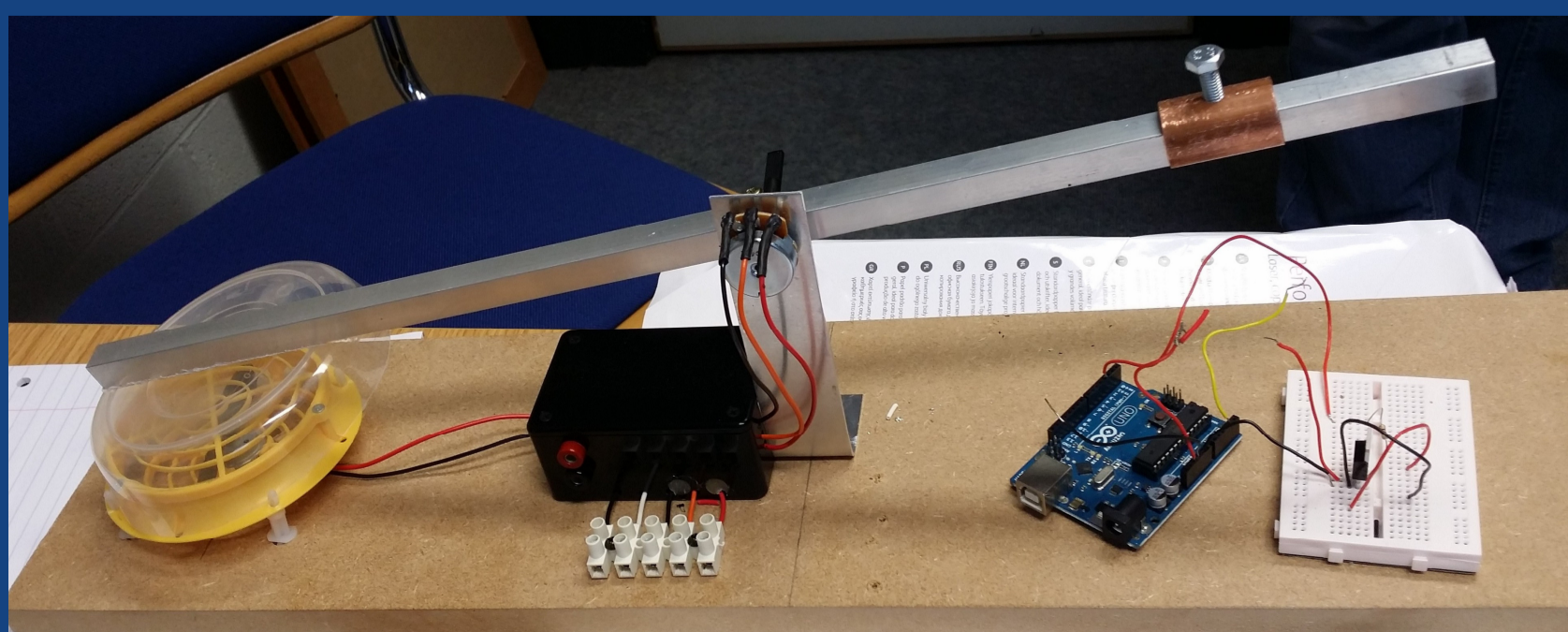
HOW IT WORKS:

- The hardware consists of a fan driven by a motor, a beam with a mechanism to catch the air from the fan and an encoder to detect the beam angle (see image).
- The hardware is connected to Matlab / Simulink (software for control) on a PC using the Arduino microprocessor (this simply acts as an input / output interface).
- By modifying the software, the hardware can be controlled – the beam can be balanced!

"... it was the moment when I finally understood the applications and usefulness of system control. It was interesting to see how using Matlab in unison with Simulink could be used for real-world purposes. In conclusion, I would definitely recommend similar projects to the balance-beam example."

IMPACT:

- The solution is both cheap and suitably proportioned to suit typical student stations in hardware labs.
- The hardware aspect now provides a visual output and a sense of realism for the students – they can really see control in action!
- Twenty such systems were built and used in a first year Electronic Engineering / Engineering Science lab on Systems and Control – it helped reinforce the theory covered in class.
- Student feedback was highly positive.



CONTACT:



Séamus McLoone, John Maloco
Dept. of Electronic Engineering