

Propulsion of a Robotic Hydro- Colonoscope

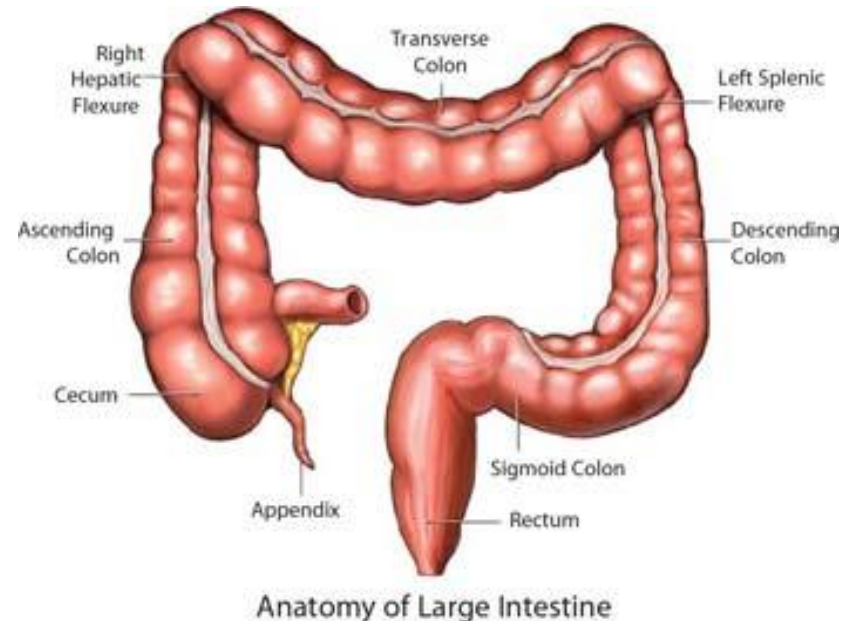
Stuart Coleman

Institute of Medical Science and Technology
University of Dundee

Surgical Robotics Summer School, Montpellier
10/09/13

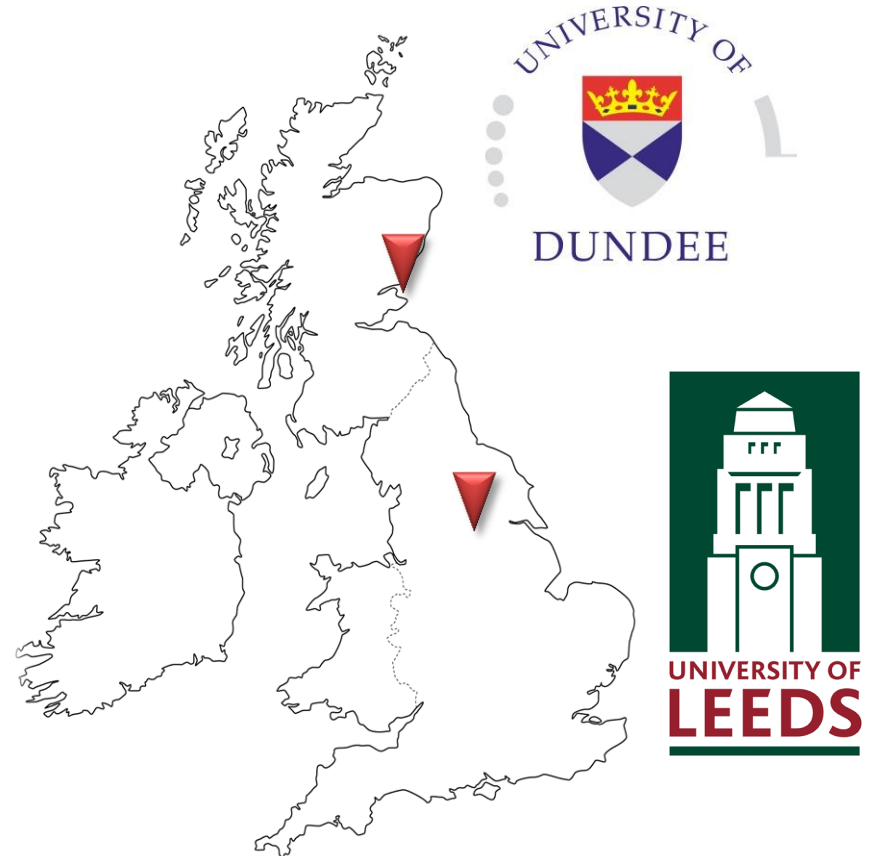
Background

- Colorectal cancer is third most common type of cancer in the world
- Screening improves survival, reduces incidence
- Colonoscopy is gold standard for screening, but:
 - Requires colonoscopist skill
 - Patient discomfort
 - Risks of complications
 - Relatively expensive





- Aims to develop a robotic colonoscope system to operate in a liquid-filled colon
- Potential advantages are reduced patient discomfort and physician workload



CODIR Team



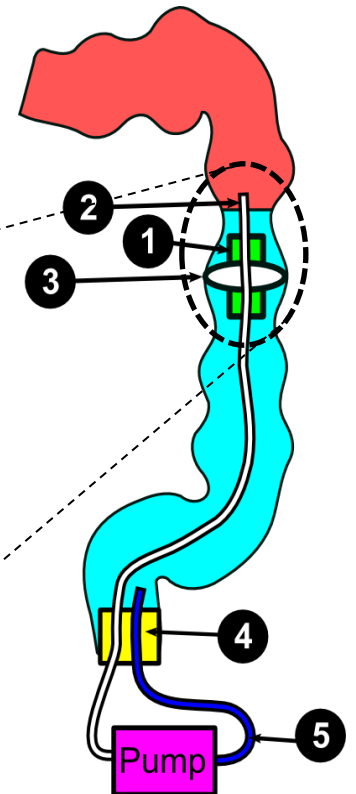
My PhD Aims: Develop a propulsion system for use in robotic hydro-colonoscopy

My Status: In 1st 6 months of PhD project, part time.

My Supervisors: Prof. Cuschieri, Prof. Cochran

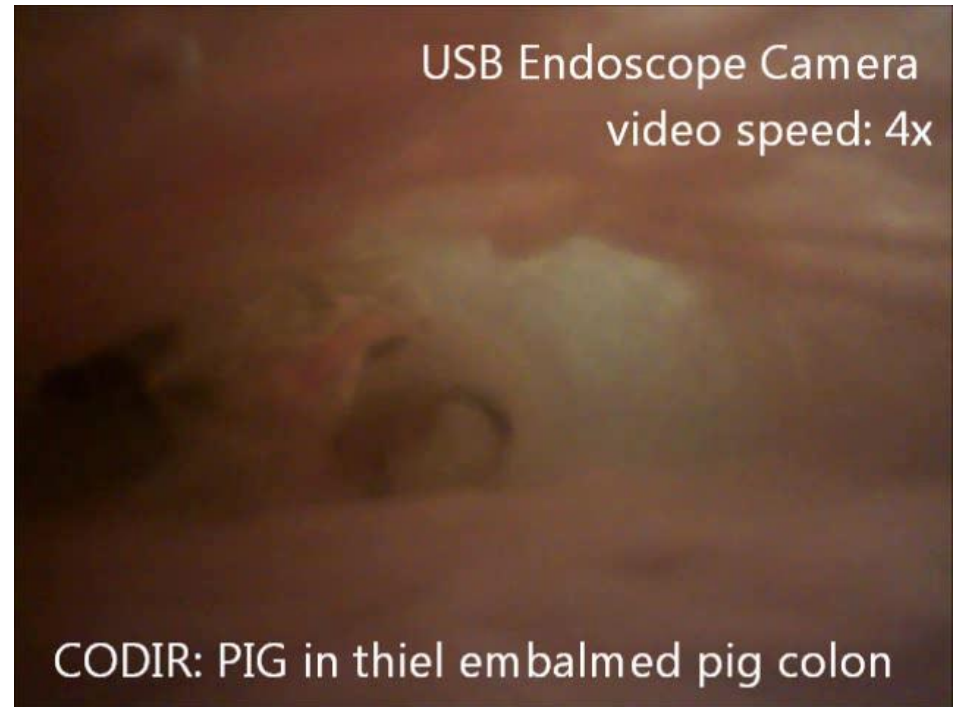
Hydraulic propulsion

- Device driven by fluid pressure differential produced by external pump(s)
- Balloons form sliding seals in colon lumen
- Pressure transducers and magnetic position sensor for feedback
- Similar to Aer-O-Scope



Initial testing

- Tests in soft-embalmed porcine colon sections, constrained in straight or curved configurations
- Manual and automated control feasible¹
- Pressure differential <4kPa (30mmHg)



¹ Tapia-Siles S, Coleman S, Cuschieri A. Pipeline Inspection Gauge device for inspection of flexures during robotic hydrocolonoscopy. Paper presented at: 21st International congress of the EASES, June 2013; Vienna.

Questions

Thanks for your attention

Any questions/comments?

s.y.coleman@dundee.ac.uk