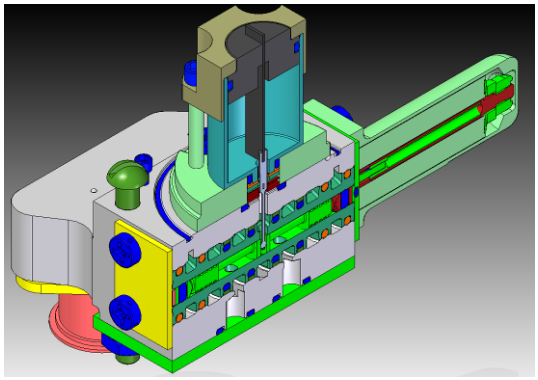
The Centre for Power Transmission and Motion Control

UNIVERSITY OF BATH

Research Project

FLUID CONTROL USING ACTIVE MATERIALS



GREAT WESTERN RESEARCH

MOOG

Background

Servovalves are used to control many actuation functions on an aircraft, including primary flight controls and aeroengine fuel control. A civil airliner possesses 30 to 40 servovalves. Servovalves are complex mechanical devices with tight manufacturing tolerances. Many manufacturing operations, including manual adjustments, are required leading to manufacturing expense and variability.

Objective

Typically a two stage servovalve has a pilot stage employing a torque motor coupled to a hydraulic amplifier with mechanical feedback of the second stage spool position. The hydraulic amplifier is generally a nozzle-flapper, a jet pipe or a deflector jet. The number of parts, tight tolerances and set up costs associated with the torque motor assembly and supporting flexure tube, add to the cost of manufacture.

The ability of active materials to respond to an external stimulus in a controlled manner, together with their high bandwidths and forces make them a promising candidate to replace the current technology.

Progress

Concepts have been reviewed and simulation has been used to select and refine a promising design. Demonstrators have been built incorporating a deflector jet servovalve driven by a piezoelectric bimorph using mechanical feedback. The concept reduces the part count and avoids the need for a flexure tube.

The projected is a collaboration with Moog Controls Ltd and is supported by Great Western Research

Researchers:	**Academic staff:**
Dhinesh Sangiah	Prof. Andrew Plummer Dr Chris Bowen

Centre for PTMC
Department of Mechanical Engineering
University of Bath
Bath, BA2 7AY, UK

Contact the Centre for further information:
Telephone: +44 (0) 1225 38-6371
Email: ptmc@bath.ac.uk
Web: http://www.bath.ac.uk/ptmc/