

MECHATRONICS IN RUSSIA: THE STORY SO FAR NOVEMBER 2006

Philip Moore

*(Mechatronics Research Group, De Montfort University, Computing Sciences and Engineering,
Leicester, UK
e-mail: prmoore@dmu.ac.uk)*

Russia's traditional strengths in aerospace, defence and specialist machinery are increasingly exploiting mechatronics design approaches, combining mechanical devices with electronics and software control systems. A recent DTI Global Watch Mission to Moscow and St Petersburg explored some of the latest developments.

Mechatronics is used extensively in robotics, aircraft and other systems that require intelligent mechanical elements. The mission, co-ordinated by the Mechatronics Research Centre at De Montfort University (DMU), focused on aerospace and defence and specialist technologies related to industries such as oil and gas.

In Moscow the team attended a specially organised workshop at the Moscow State Technological University 'Stankin' (MSTU 'Stankin') where research organisations and companies presented their mechatronics programmes and capabilities. Many were developing devices for inspection of oil and gas pipelines, medical uses and manufacturing. Research & Manufacturing Corporation TARIS, a progressive small company that makes robotic systems for sewer, water main and pipeline inspection, oil well visual inspection and other applications was also visited.

At Bauman Moscow State Technical University (Bauman MSTU), which has a long history of collaboration with DMU, researchers are developing robots for emergency applications such as bomb disposal, nuclear incidents etc. They are also working on micro gyroscopes and accelerometers for autonomous devices e.g. unmanned aerial vehicles (UAVs).

The Technical University, Moscow State Institute of Radiotechnics Electronics and Automatics, was visited and some innovative techniques for education in mechatronics and robotics were seen as well as innovative work on autonomous control systems for mobile robots. The State Academy of Sciences (SAS) Institute for Problems in Mechanics, Laboratory of Robotics and Mechatronics is working with other institutes to develop 'gecko' robots that use nano-fibres to provide 'stickiness' to walk on walls and ceilings. New types of movement are being explored to enable them to operate in awkward spaces.

In St Petersburg the team visited the Russian State Scientific Center for Robotics and Technical Cybernetics, which developed robotics systems for the Russian space programme. The centre is working with St Petersburg State Polytechnic University (SPbSPU) to educate a new generation of robotics and mechatronics engineers. Projects include UAVs and robotic snakes made of modular elements that can simulate a real snake's movements.

A second workshop at SPbSPU involved several universities and research institutes. Interesting applications included large mechatronic figures (or animatronics) and automated stage sets for theatres, including the Marynsky Theatre, home of the Kirov Ballet.

The mission presented an excellent opportunity for the delegation to assess mechatronics technologies in Russian research institutes and universities across a range of applications and to identify leading edge technologies that could find future applications in UK industry. It was not possible to assess mechatronics in large aerospace and defence companies as access was not achieved despite assistance from the Russian Ministry of Industry and Energy.