

**PIONEERING RESEARCH
AND SKILLS**
Annual report and accounts 2008–2009



'Self-healing' aircraft?

A new technique that mimics healing processes found in nature could enable damaged aircraft to mend themselves automatically, even during flight. Developed by the University of Bristol with EPSRC support, the breakthrough offers obvious safety benefits and the potential for lighter aircraft leading to fuel savings in the aircraft industry and environmental benefit from reduced carbon emissions.

The simple but ingenious technique is like the bruising and bleeding/healing process in the human body. If a tiny hole or crack appears in an aircraft, epoxy resin would 'bleed' from embedded vessels near the damage and quickly seal it restoring the structural integrity. By mixing dye in the resin, any 'self mends' could

be made to show as coloured patches that could easily be pinpointed during subsequent ground inspections, and a full repair carried out. Lead researcher Ian Bond of the University of Bristol says: 'This approach can deal with damage not obvious to the naked eye but which can lead to serious structural failures'.

His team are collaborating with industrial partner Hexcel Composites Ltd to develop the technique to make it available for commercialisation.

Flying colours: fractured fibre-reinforced polymer under UV illumination showing how the 'healing agent' bleeds into the damage.



CHALLENGES FOR SOCIETY AND THE ECONOMY CONTINUED

£120m

£120m for cross-council 'Digital Economy' research programme.

science and technology that highlights the importance of the RCUK Science in Society programme which engages the wider public in the potential impact on society of EPSRC-supported research. For example the importance of the public's views on the future of nanotechnology emerged from a public dialogue exercise prompted by the EPSRC Societal Issues Panel, and are helping shape research funding in the area. Also in 2008 the outcome of public dialogue research on energy by Ipsos MORI, commissioned for the joint Research Councils' Energy Programme, was published.

DIGITAL ECONOMY

The 'Digital Economy' encapsulates research and development that delivers novel design or use of technologies to help transform the lives of individuals, society as a whole, the business sector and government. This cross-council research programme led by EPSRC has a joint funding commitment of £120 million. Such research may lead to many life-changing breakthroughs from projects such as:

- Improving the treatment of patients with heart disease by using personalised computer models which can accept real time data, like electrical patterns and blood pressure;
- An integrated transport system, connecting traveller's vehicles and services to provide personalised information that will help influence travel behaviour; and
- A computer tool incorporating GPS and barcode scanners to help children who cannot speak create a story about their day at school.

A major new investment of £38 million was announced by the Research Council this year to create 'Research Hubs' in Digital Economy. These are large, multidisciplinary research centres that will build capacity and expertise in priority areas and drive a cultural change in the way to deliver digital technology. Proposals were invited from institutions to form new multidisciplinary centres encompassing the arts and humanities, medical sciences and economic and social sciences, as well as engineering and physical sciences. Interaction with industry partners and a range of other stakeholders will ensure that the new Hubs