An EPSRC Perspective…

On light metals research in Engineering, Materials Science and Manufacturing

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EPSRC
UK Government

Treasury

Dept. of Business, Innovation and Skills

Research Councils UK

- Arts and Humanities
- Biotechnology and Biological Sciences
- Economic and Social
- Engineering and Physical Sciences
- Medical
- Natural Environment
- Science and Technology Facilities

Higher Education Funding Council for England

Promotes and funds teaching and research in higher education institutions.

Technology Strategy Board

Accelerate economic growth by stimulating and supporting business-led innovation.

UK Government

Promotes and funds teaching and research in higher education institutions.
The UK Innovation Landscape

User requirements/market opportunities

Discover  Understand  Adapt/Integrate  Validate  Deploy

EPSRC and other research councils

Technology Strategy Board and other partners

Government and business

Universities  Commercialisation

Initiation  Exploitation
Shaping Capability

will encourage the free generation of ideas, curiosity and research creativity while basing investment decisions on international excellence and national importance of the research and training to the UK

Delivering Impact

will create an environment that promotes excellence, encourages innovation, stimulates creativity and drives cultural, commercial and technological advances

Developing Leaders

will nurture the visionary leaders who set research agendas, and inspirational team leaders who act as role models
**EPSRC Delivery Plan: 2011 - 2015**

Projected Spend by Theme

- **Investigator-Driven Research**: £1645M
- **Healthcare**: £304M
- **Manufacturing**: £322M
- **Energy**: £439M

Values shown are cumulative over four years
Policy and Strategy Context for Manufacturing the Future
Current Political Context

Industrial Strategy

Fiscal

Technology

Geography

Sectors

Witty Review: Universities & Growth
Understanding, modelling and processing of metals and alloys with respect to the properties and material behaviour, the influence of these properties on engineering and manufacturing applications and the development of novel materials.

- All Metals research (although Light Alloys is a smaller subdivision).
- £89 million current grant portfolio
- Related to Manufacturing, Engineering, Energy and Physical Sciences themes
- “Maintain” research area within Shaping aspect of Delivery Plan
The 2008 Materials International Review highlighted a potential decline in the area. Since the review, EPSRC has made significant investments to build the international competitiveness of UK research in metals and alloys.

Metals and alloys highlighted by the Materials Innovation and Growth Team in their 2006 strategy, as an important part of the overall materials strategy for the UK.

- World class materials expertise underpins sustainable growth.
- Metals and alloys processing is important to enabling technology innovation in key industries.
- Opportunity to reduce demand for materials through efficient use of resources.
Key EPSRC Investments in Light Metals (1)

EPSRC Centre for Innovative Manufacturing in Liquid Metal Engineering (LiME, Professor Z Fan, Brunel £3.8m)
- Manufacturing the Future flagship Centre
- Understanding nucleation process and control; improving casting quality through liquid metal engineering.

Towards Affordable, Closed-Loop Recyclable Future Low Carbon Vehicle Structures (TARF-LCV, Professor Z Fan, Brunel £4.2m)
- Low Carbon Vehicles call linked with TSB LCV IP
- Advanced materials (Al & Mg alloys, metal and polymer matrix composites) manufacturing technologies, holistic design and closed-loop recycling
Key EPSRC Investments in Light Metals (2)

Programme Grants

Light Alloys Towards Environmentally Sustainable Transport: 2nd Generation Solutions for Advanced Metallic Systems (LATEST2, Professor GE Thompson, Manchester £5.8m)

- Combining advanced Al and Mg alloys with composites, laminates, and steel products
- Enable complex, light, cheap and recyclable design solutions

Heterogeneous Mechanics in Hexagonal Alloys across Length and Time Scales (Professor FP Dunne, Imperial College £5m)

- Optimization of hexagonal material performance, largely titanium, zirconium and magnesium alloys used by the aero, energy and defence sectors
Key EPSRC Investments in Light Metals (3)
Great Technologies Capital Call

Scale-up Facilities for Resource Efficient Processing of High Performance Alloys to Brunel University (Professor Z Fan, Brunel £3.8m)
- National scale-up facility for light metal casting research, hosted in the Advanced Metal Casting Centre (AMCC) at Brunel University

Multifunctional high performance alloys for extreme environments to the University of Oxford (Professor Roger Reed, £3.5m)
- Four inter-linked research laboratories, materials design, advanced processing, materials analysis and materials performance,
- Capability to design prototype metallic systems to operate in some of the harshest industrial environments
Who are the academic players in ‘Metals & Alloys’ Research?

<table>
<thead>
<tr>
<th>Institution</th>
<th>Projects</th>
<th>Total Value, M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imperial</td>
<td>8</td>
<td>£14.1</td>
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<tr>
<td>Brunel</td>
<td>4</td>
<td>£13.5</td>
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<td>Birmingham</td>
<td>5</td>
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<tr>
<td>Oxford</td>
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<tr>
<td>Manchester</td>
<td>10</td>
<td>£12.5</td>
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<tr>
<td>Sheffield</td>
<td>6</td>
<td>£9.7</td>
</tr>
<tr>
<td>Cambridge</td>
<td>6</td>
<td>£5.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>44 (71%)</strong></td>
<td><strong>£81.7 (91%)</strong></td>
</tr>
</tbody>
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Funding opportunities

Strategic Programmes
- Calls for proposals in strategic areas.
- Multi-disciplinary teams.
- “Pathways to manufacture”.

Research Projects
- Standard applications (through Engineering).
- Investigator led research (Manufacturing).
- Networks & Travel.
- Fellowships.

Innovation
- TSB calls
- Horizon 2020

Developing Leaders
- Manufacturing Fellowships.
- EPSRC Fellowship Scheme.

EPSRC
Pioneering research and skills
Future Opportunities

There is a desire to maintain world-class materials expertise which underpins sustainable growth.

Opportunity to focus on reducing demand for materials through efficient use of resources.

Opportunity to fully take advantage of recent capital investment in the area through the recent Great Technologies call.

Opportunities for Light Metals community:

- Address industrial challenges
- Demonstrate alignment to government strategies
- Capitalise and complement existing investments
- Focus on impact and how the UK can benefit in skills & economic growth
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