Introduction

• Introduction
• The Bloodhound Project
  – STEM Enrichment & Engagement
• Bloodhound@University
  – Aims
  – Activities
  – Approach

Experiencing a shortage of engineers into the MOD, Lord Drayson, Minister for Defence Equipment and Support indicates that he would be keen to see a new iconic British high technology project to stimulate national interest in engineering technology in schools.
The current situation

There are serious current problems with supply of engineers

- Following examples have demonstrated serious gaps
  - Airbus
  - Astrium
  - Npower
- EDF
- Rolls-Royce
- Ministry of Defence

Reality - ETB report Dec. 2007

- Forecast decline in 16 & 18 years cohorts (-16% & -13%) in next decade will affect employers
- GCSE volumes of key STEM have been increasing 5%
- At GCE A levels the gender gap is slowly reaching parity
- Provisional figures for 2007 saw a rise in maths

Reality - Royal Academy June 2007

- Over next 10 years the UK is facing an increasing shortage of high calibre engineering graduates
- Between 1994-2004 the number of engineering degree starts remained static at 24,500/year while university admissions rose by 40%
- Engineering courses must develop in line with real and constantly evolving requirements of industry
- To fill the pipeline, more must be done to ensure that schools students, parents and teachers perceive engineering as an exciting and worthwhile subject that offers stimulating and well paid careers.
Apollo Effect 1961-72.
The World Land Speed Record

- The FIA World Record for the fastest car
- Traditional opposition – the US
- Generates vast global media coverage
- Unlimited design – but must have 4 or more wheels
- Requires very advanced engineering
- Involves 2-300 companies in the supply chain
- Held by Britain for 65 out of 109 years
- The Thrust teams have held the World Land Speed Record for 24 years continuously.

Thrust 2 1983 – 633.468mph M 0.84
ThrustSSC 1997- 763.035mph M1.02

- ThrustSSC: first ever supersonic record-current
- Website peaked at 3.5 million accesses (11m pages/day)
- UK media – 1col/kilometre
- Global media – on satellite television for 10 years
- Most famous car in the World – purchased by UK lottery
- $60m movie in development at Pinewood Studios.
- Currency today:
  - YOUTUBE views 2,785,449.
  - Frozen website still runs 2000 pages /day.
Mission Statement:

To:  
Confront the impossible and to overcome using Science Engineering Technology and Mathematics.

Why?:
An engineering adventure to inspire prepare and motivate the next generation who will be building and living in the low carbon World.

OBJECTIVES (ranked in importance)
1. To create a national surge in popularity of Science and Engineering (STEM subjects)
2. To create an iconic project requiring extreme research and technology whilst providing the means to enable the student population to join in the adventure.
3. To achieve the first 1000mph record on land
4. To generate very substantial and enduring media exposure for sponsors
Making it Happen

Four Year Programme

- **July 2007 - October 2008**
  Research programme and Project launch
- **November 2008 - Aug 2009**
  Detail design & Vehicle build
- **September/Oct 2009**
  800mph target
- **September / Oct 2010**
  900mph target
- **September/Oct 2011**
  1000mph record

### Bloodhound Organisation

- Bloodhound Education Team develops and runs the schools programme
- Bloodhound Engineering develops builds and operates the car
- Bloodhound Communication manages PR communications internet activity and Supporters Club
- Bloodhound Back Office – handles all marketing, accounting company secretary etc
The Car
How did we get involved?

- August 2006 – JCB DieselMax Car
- WLSR – Diesel engine
- 350.092 mph
- John Piper – Chief Design Engineer
Would you like to meet Richard Noble?

Bloodhound Educational Team

- **Prime Objective:** To use Project to encourage school leavers to take up study of Engineering, STEM and enter Engineering related careers

  - 3 year programme main focus – all schools 5-19 years.
  - Web driven programme
  - Being created and managed by a very small team
  - Commences operation November 2008
## Bloodhound Educational Team

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Institution</th>
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<tbody>
<tr>
<td>Chair</td>
<td>David Rowley</td>
<td>Royal Academy of Engineering</td>
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<tr>
<td>Founder/Exec Secretary</td>
<td>Joanna Coleman EPSRC</td>
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<tr>
<td>Education Director</td>
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<td>Under recruitment</td>
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<tr>
<td>Distribution Director</td>
<td></td>
<td>Under recruitment</td>
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<tr>
<td>Kate Bellingham</td>
<td></td>
<td>Ambassador</td>
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<tr>
<td>John Lanham</td>
<td></td>
<td>University of West of England</td>
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<td>Martin Hine</td>
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<td>Ministry of Defence</td>
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<td>Sally Wilson</td>
<td></td>
<td>SERCO plc</td>
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<tr>
<td>Jan Stapleton</td>
<td></td>
<td>Institution of Engineering and Technology</td>
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<tr>
<td>Declan Swan</td>
<td></td>
<td>National Education Business Partnership</td>
</tr>
<tr>
<td>Marcus Wade</td>
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<td>Year in Industry Student – support</td>
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Supported by EPSRC, ETB, Royal Academy, G-15 Institutions, ERA
A pleasant surprise – UWE a Founder Sponsor

- Thrust 2 & Thrust SSC Sponsorship model
- Founder Sponsor – name on the car
- Product Sponsor – use their name on your products in exchange for “donating” products / services to project.

- June 2008 – UWE signs up as one of five founder sponsors – UWE’s logo will be on the car.
Other Founder Sponsors

- Swansea University
- Prifysgol Abertawe
- STP
- Serco
- EPSRC
- University of the West of England
- University of Bristol
UWE’s Contributions to date

- Housed design team since January 2008
- Manufactured test items
- Visitor Centre Development
  - Multiple iterations!!
- Environmental Evaluation
- Model manufacture
- Bloodhound@University
- Simulator Project – with Southampton
Education / Visitor Centre

- Bloodhound vision is for the car to be housed/built in a centre that will allow easy access for school groups – a goldfish bowl where the youngsters can come along and see the car developing and being built.

- Hands-on/exploratory type environment

- Communicate Bloodhound across age range – and general public at weekends!

- Require access to a large building – 25,000/30,000 sq ft, parking and a runway for testing!
Model Manufacture

- Neil Jones
- Chris Hart
Objective: Using the Bloodhound project to enhance British engineering higher education

- Integrate information from the project into HE STEM education
- Teaching materials, case studies, projects, competitions ....
- Web Portal for dissemination
Unique access to what & why?

- ROCKET
- JET
- UPPER CHASSIS FRAME
- COMPOSITE INLET DUCT
- REAR SUB FRAME
- LOWER CHASSIS FRAME
- JET FUEL TANK
- APU V12 ENGINE Drives HTP PUMP
- SIMPLER COMPOSITE INLET DUCT
- DEEP TRELLIS FRAME
- JET FUEL TANK
- APU V12 ENGINE HTP PUMP
- COCKPIT
Higher Education Working Together

- University of Southampton
- School of Engineering Sciences
- UWE Bristol
- University of the West of England
- Swansea University
- Prifysgol Abertawe
- The University of Manchester
- University of Birmingham
- University of Exeter
- University of Hertfordshire
- Oxford Brookes University
- Sheffield Hallam University
- The University of Winchester
- University of Brighton
- University of Cumbria
- Technische Universiteit Delft
Initial HE Facing projects

- Housing Mock-Up build
- Student Design Project s– Cockpit Ergonomics
- Turn-round planning
- Bloodhound@University Web portal
Bloodhound Placements
Open access philosophy –
open to all HE staff to contribute to
Built on UWE E-Learning system that enables multiple perspectives on data
- Vehicle, Design Lifecycle, …
- Flexible reuse of information

http://bloodhoundssc.uwe.ac.uk/RenderPages/RenderHomePage.aspx
Simulator

- Primarily as an engagement tool – not a design tool!
- Southampton – adaptation of MicroSoft Flight Sim
- UWE body shell
• Bloodhound will provide unique access to data throughout the lifecycle of the project.

• Rich source of educational material – not only the details of the designs – but also an insight into the thinking/ rationale of choices

• Ideas that worked – – and some that didn’t !
Integrated Educational Perspective

- STEM is more than just Technology & Engineering
- Project Management
  - What are lessons learnt for other R&D activities
- Environmental dimensions
  - What is impact of a project such as this?
- Pedagogic aspects
  - How can we better teach 21st C STEM students in the future?
  - What is the role / contribution of the Web / IT?
Design Team – John Piper – Design, Build and run car.

Education Team - Dave Rowley – communicate information about the project across education spectrum.

Tony Parraman – Educational Liaison – link between Design & Education teams
Industrial Relevance & Opportunities

• Partnerships – key element of Bloodhound
  – Collaboration for mutual benefit – for Education and for Industry

• Continuing Professional Development Opportunities
  – Aspects of BH@Uni could be used as very effective CPD support materials
  – Portal could provide on-demand access to staff and companies

• Specialist guidance / authoring support from industry

• Collaborative Funding Bids
Where next?

That’s what today is about
The Bloodhound Legacy?

- What can we learn from this project – as educators – that we can apply to other areas of our teaching activities?
- How can we exploit / use / develop IT based approaches to enhance and enrich aspects of our teaching?
- What’s the next Bloodhound??