



## Developing long term industrial partnerships in research

**Adrian Allen**  
*Director and Co-Founder*  
*AMRC with Boeing*

November, 2014



**BIS** | Department for Business  
Innovation & Skills

**EPSRC**  
Engineering and Physical Sciences  
Research Council

**CATAPULT**  
High Value Manufacturing

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## Universal objectives



Propagate inward investment to **create jobs**...

Show off the reward of innovation...

Overcome the skills shortage...

Bridge the gap between academia and industry...

Lower income tax through wealth and job creation...

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## Singular success



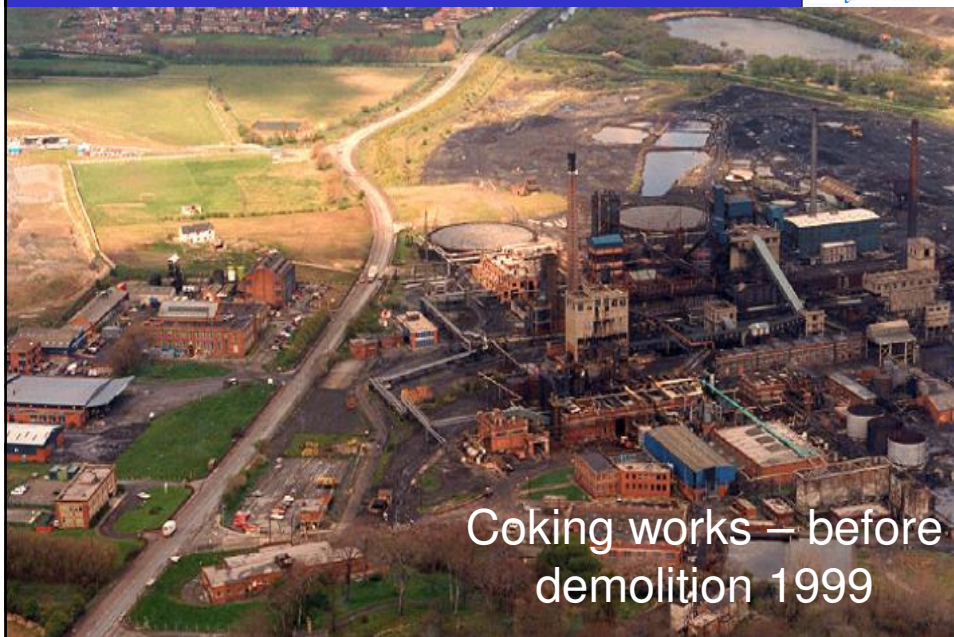
To an extent we've been there done that...

In ten years created over 1000 direct jobs having persuaded a £60 billion p/a company to invest their global R&D on an ex-slag heap

On the back of university-led innovation developed with local industry

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## En route turned a sow's ear



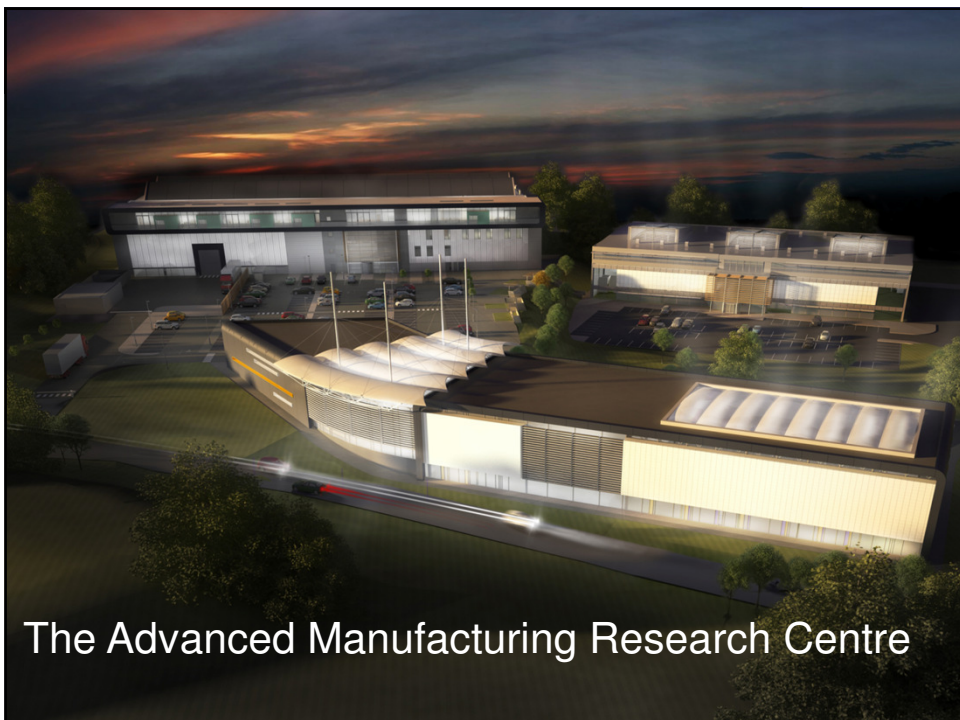
Coking works — before  
demolition 1999

# Into a silk purse



The Advanced Manufacturing Park 2014

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# From small acorns...



# Partners



## Why and how



We were frustrated trying to transfer technology

I grew up in Sheffield and witnessed the catastrophic consequences of thousands of jobs lost due to complacency and technology

Decided to do something about it

## Why metals and manufacturing matter to me



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### South Yorkshire

- Thousands employed
- World reputation
- World class 'products'
- Unique skills



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## And then...



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### **1969**

- 55% of Sheffield jobs were in manufacturing
- Most manufacturing was in traditional skills of steel and metals industries.
- Labour-force largely trained in traditional manufacturing methods

### **1970-2000**

- 92,000 manufacturing jobs lost (75% of total)

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# One tool - \$billion savings



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# The reality...

## Phantom Works Innovation Stokes Future Projects

DAVID A. RAGHAM/ST. LOUIS

One key Boeing expectation is that Phantom Works, the company's outlying of new ideas, technologies and processes, will make the first

of the company's competitors.

Phantom Works, headquartered in St. Louis, has been established in Southern California, Seattle and other locations, but had the role of managing several projects that may become products in 10-20 years.

Now the mandate has been expanded to finding out how to get the most out of the

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Ways of making a faster, better, and cheaper product for the aerospace industry were explored by customers, manufacturers, suppliers, and academia at SAE's annual Aerospace Manufacturing Technology Conference held in June.



Boeing says

given work in the

through the project

and development

efforts, Boeing is

anticipating that

work will have been

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**“Faster, Better, Cheaper, Greener - the mantra for the Millennium”**

BOEING'S MILITARY BUSINESS

Boeing's military business

is a key part of the company's

overall strategy. The company

has been investing heavily in

research and development

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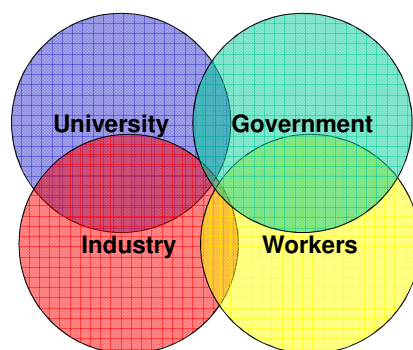
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# How?

One Vision and 3 Cs

Capacity,  
Capability,  
Commitment

# How? 'Collaborative' Approach:



Finding, and continuing to find the match = Secret to sustainability



# The proposal...



South Yorkshire Centre of Excellence

# SYCOE

Applied research & development in to next generation machining technologies.



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# What has been created?



Seven centres employing:

**Best people**

>400 staff > 200 MSc or PhD

**Best processes**

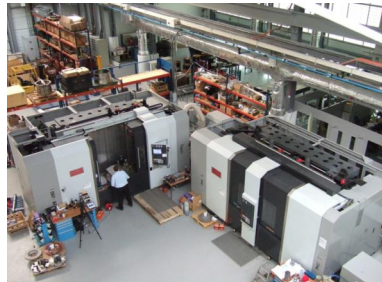
From IGPS to IPQA

**Best plant**

>£100 million SOTA facilities

**Best partners**

> 100 committed industrial sponsors

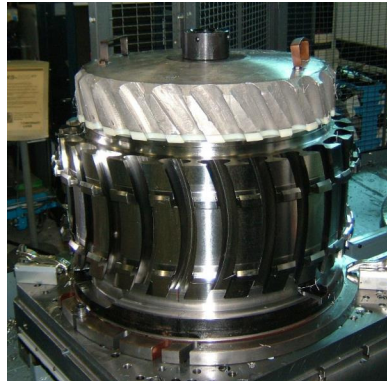


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## Case study: HPDM



- Rolls-Royce led.  
Create/validate SOA process to be transferred onto 48 new machines.
- Achieved a **50%** reduction in overall manufacturing time – vast savings on NRC and RCs.
- Added benefits to other partners including British Government.

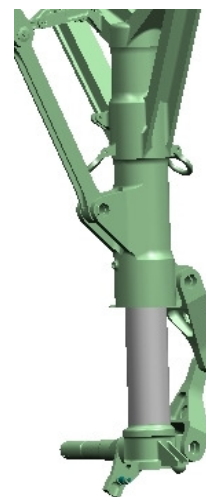


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## Regional Impact



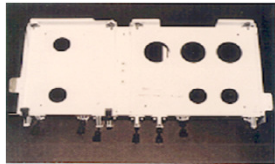
- Regional supply chain
  - e.g. Orders for Corus, Firth Rixon, Doncasters, Fletchers, Forgemasters, Thorntons, Technicut, Newburgh, Nikken, Mahers, Reliance Gears, Johnson and Allen, Pryors etc.
- Inward Investment to the AMP
  - e.g. Rolls-Royce, Nikken, Technicut, Mahers, Carpenters, Mori Seiki, TWI, CTI, Pro-Laser, Vibrant NDT, AML, Dormer, Liebherr, Bromley FI etc. etc.



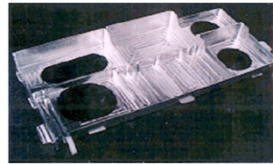
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# When it's all put together...

(Typically large and thin walled)



**73%  
Cost Reduction**



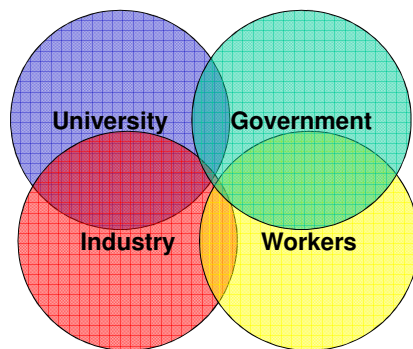
**Was**

Number of Pieces.....	44
Number of Tools.....	53
Design & Fabrication hr (Tools)...	965
Fabrication hr.....	13
Assembly Man-hours.....	50
Weight (lb).....	9.58

**Now**

Number of Pieces.....	6
Number of Tools.....	5
Design & Fabrication hr (Tools)....	30
Fabrication hr.....	8.6
Assembly Man-hours.....	5.3
Weight (lb).....	8.56

# Collaborative Approach



Finding, and continuing to find the match = Secret to sustainability

# Vision



# Next generation manufacturing



## Ambassadors for engineering



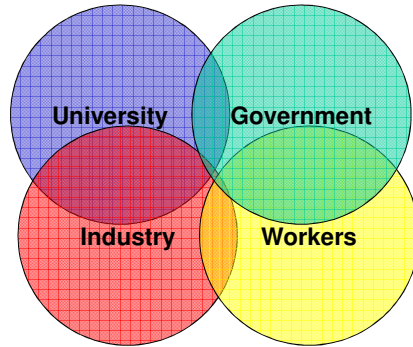
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## Everyone on board



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## How? 'Collaborative' Approach:



Finding, and continuing to find the match = Secret to sustainability

## Success





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# Thank you

[a.allen@amrc.co.uk](mailto:a.allen@amrc.co.uk)

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