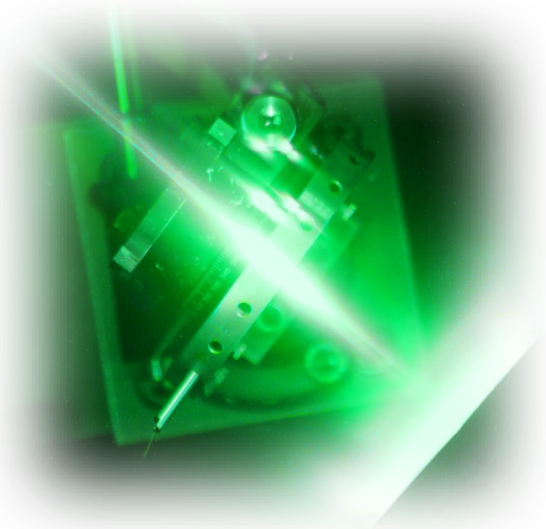




# Utilising the Ideas



**Ric Allott**

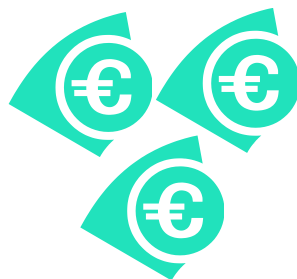
**Head of Innovation Projects  
Business Development Manager  
STFC Rutherford Appleton  
Laboratory**



# Research Innovation Cycle

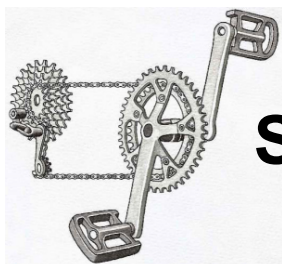
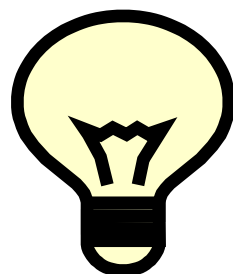
Fundamental  
Research

**A + b**



Innovation

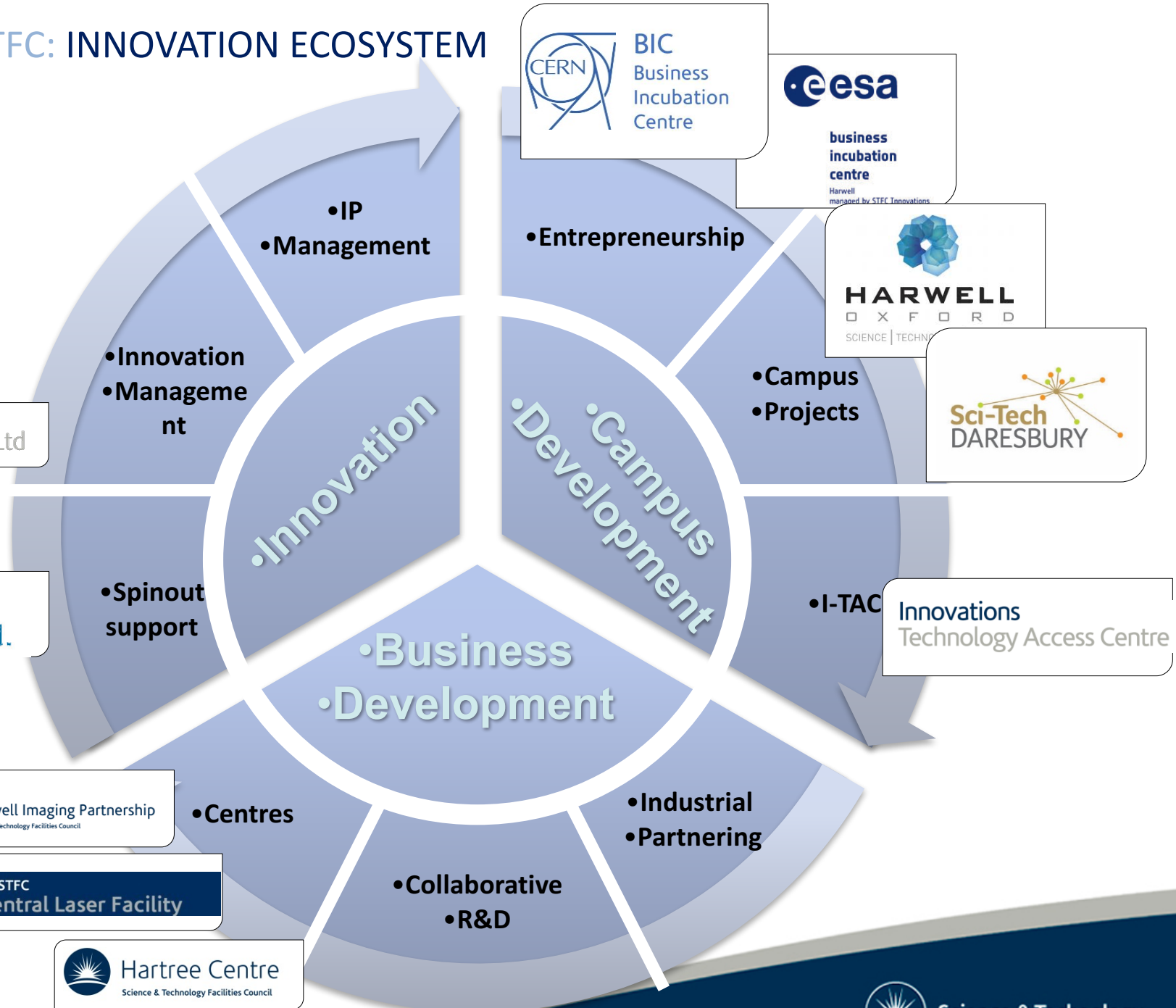
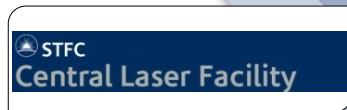
**B + a**



**STFC Helping to Drive the Cycle**



# STFC: INNOVATION ECOSYSTEM





# STFC Innovation Stats



## Companies House

19 spin-out companies created to date



44 royalty bearing licences  
65 patent families  
152 granted patents

Investment



>£73m external investment into those companies (excluding grants etc.)



123 employees in our spinouts (currently) - including 28 new jobs last year  
213 jobs in total



## 3 case studies from the Central Laser Facility

- The Centre for Advanced Laser Technology and Applications (CALTA) – *a spin-out generator (?)*
- Scitech Precision Ltd – *a small spin-out, steadily growing*
- Cobalt Light Systems Ltd – *a mature spin-out, recently sold*

- Formed in 2012 to drive the journey from *phenomena* to *deployment* within academia, industry and Government

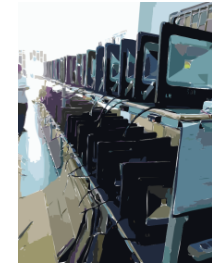
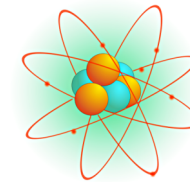
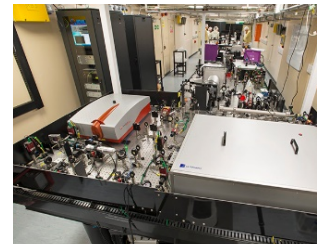
**VULCAN**  
3 shots p.h.



**Gemini**  
3 shots p.m.

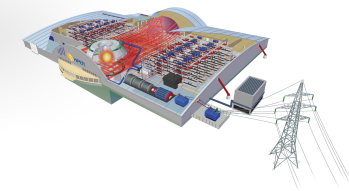


**DiPOLE**  
10 Hz / 1 kW



- User programme
- Fundamental science
- Advanced sources
- Identification of applications
- Publications

- Technology
- PoC applications



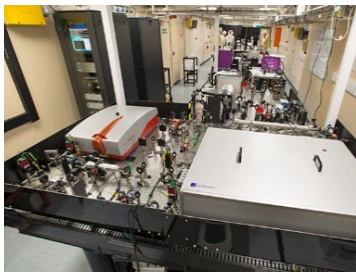
## Our people

**9 full time, experienced, PhD-qualified scientists and engineers**

**5 project delivery support staff**

**Access to CLF and STFC engineers, scientists and technologists**

## Our World-leading, unique “DiPOLE” laser architecture



**High efficiency (> 25% electrical to optical)**

**High power (1kW average; 10GW pulsed)**

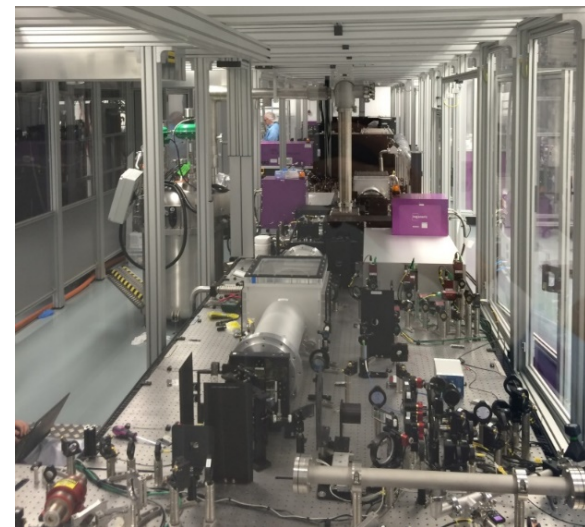
**High repetition rate (10 pulses per sec)**

## Our facilities

**STFC’s HPC platforms, modelling & simulation codes, cryogenic systems, advanced detector technologies, etc.**

# 100 J, 10 Hz DPPSL: A World First for CLF

- DiPOLE 100 system constructed at RAL and commissioned at 100J / 1Hz
- Shipped to Prague in Dec '15 and re-commissioned at 1 Hz in July '16



- Operated at 10 Hz / 1.06 kW for 1 hour without operator intervention in Dec '16



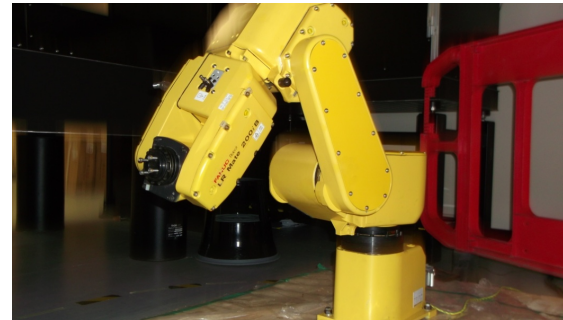
•Institute of Physics  
•Prague, CZ

DiPOLE100



# CALTA successes

- **£26M business won since 2012**
- **1kW DiPOLE-100 system installed in Czech Republic for industrial applications in aerospace, nuclear, optics and motor industries**
- **Funding for “in-house” laser peening research laboratory**
- **A second DiPOLE-100 system under construction for supply to European XFEL project as UK “in-kind” contribution**
- **“Widespread Teaming” award in partnership with HiLASE facility and Czech ministry of Science (5 years; 48 Meuro)**



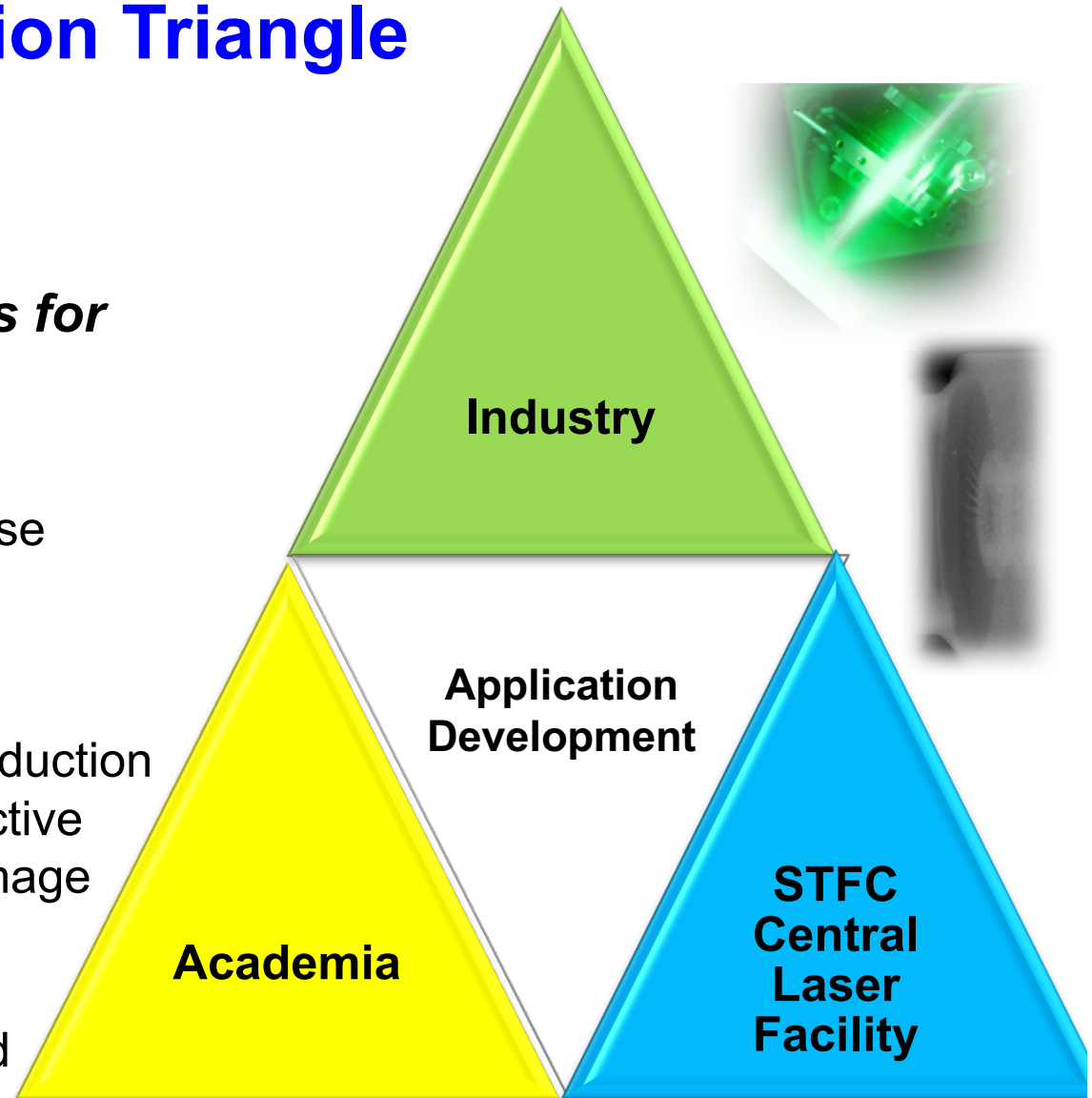


# CLF Collaboration Triangle

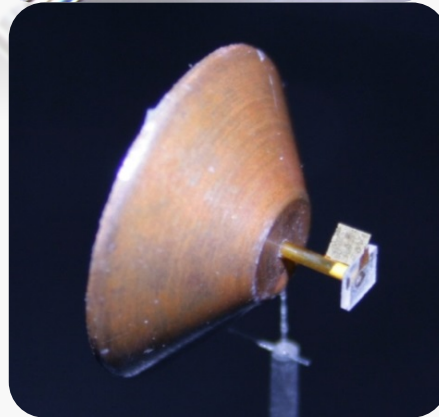
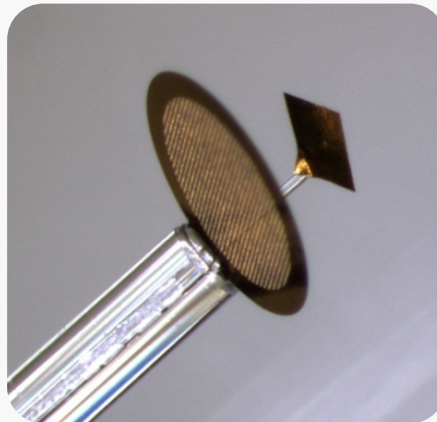
## Example:

### *Laser-Driven Radiation Sources for Advanced Imaging*

- Using the most powerful and intense lasers in the world to drive micro-accelerators
- High-quality secondary source production for advanced imaging, non-destructive testing and inspection, ultra-fast image capture
- Applications for medical, advanced manufacturing and security sectors already identified



# SCITECH PRECISION LTD



- Scitech Precision is a spin out from CLF, STFC
- Limited company currently wholly owned by STFC
- Access to all of the CLF and RAL equipment and expertise
- Over 40 contracts / year

- The dedicated Target Fabrication Facility at CLF located right next to the High Power Lasers it serves is one of very few globally.
- Demand grew from scientists across the globe for expertise in target design and fabrication.
- To service this demand Scitech was set up in 2009 with just one member of staff.
- In 2011 a large contract enabled new staff to be employed.
- In 2012 Scitech acquired Colsicoat (another CLF spin out).
- In 2015 Scitech acquired Micronanics enabling Laser micromachining capability to be brought in house.

# EXPERTISE IN MULTIPLE TECHNOLOGIES

- With dedicated cleanrooms SPL offer
  - Laser micro targets, Laser micro machining, Phase plates, MEMS technologies
  - High throughput target equipment

• Advan

• Phas

• MEM

• Laser

- L

• Scite precision also:

- Work collaboratively to develop novel and unique target solutions worldwide
- We also offer Student, and PhD training

- **Majority of contracts now from Beamlines rather than Laser Facilities**
- **Big Opportunities- driven by increase in rep rate of HPL's**

guarantee quality

Currently employ 4-5 staff and growing steadily

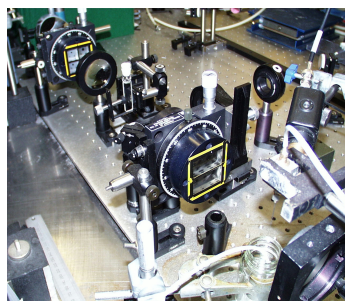


# SPINOUT: COBALT LIGHT SYSTEMS

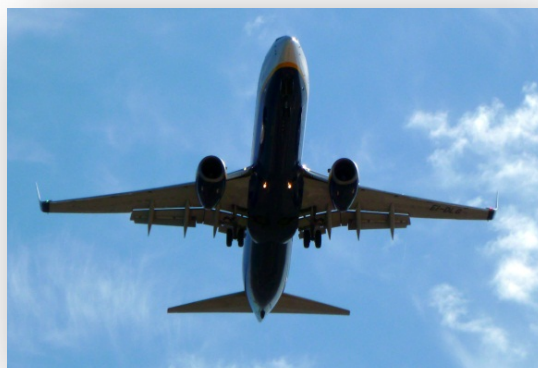


## Cobalt Light Systems

Spun out of STFC in 2008 to commercialise instrumentation based on a new technique discovered at CLF – SORS (Spatially Offset Raman Spectroscopy) which is able to detect the chemical fingerprint of materials through several millimetres of a barrier such as paper, glass, plastic, fabric, thin metallic containers and skin.



A multi-award winning Company



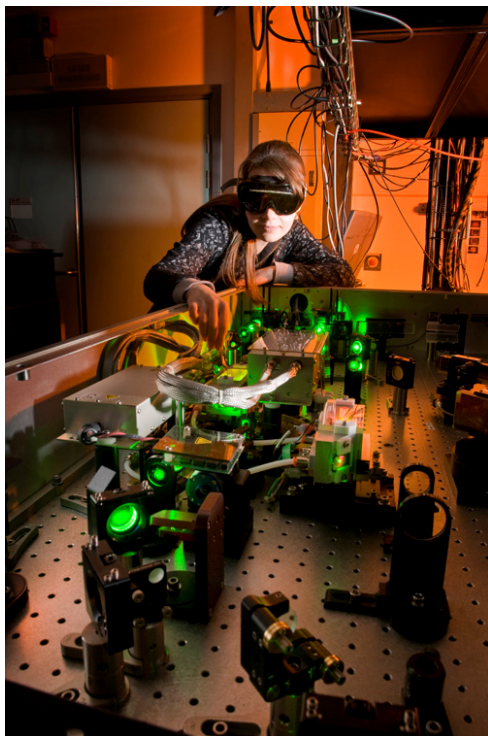
Airport Security



Pharmaceutical

Patent Filed 2005	Company Formed 2008	Insight100 in Airports 2014	SORS detects brittle bone disease 2014	Cobalt Inc opens in US 2015
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## A journey of >12 years!



From complex lab  
to hand held  
device



Photo from Cobalt website

Acquired by Agilent Technologies  
July 2017

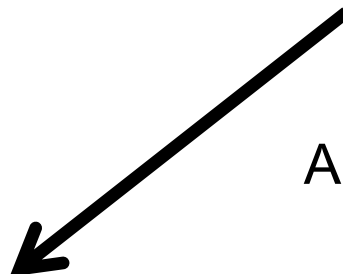


Photo from Cobalt website

The future Oxfordshire, U.K.  
headquarters of Agilent Raman  
Spectroscopy



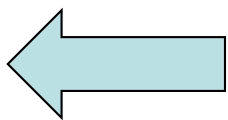
# Benefits of Industrial Engagement

## To Academia

- Enables world leading research to be exploited
- Helps to shape future research directions – meeting the needs of industry
- Provides opportunities for skilled people to contribute to the economy and society

## To Business

- Improves and expands networks
- Provides access to state-of-the-art equipment and facilities
- Enables access to world leading experts
- Allows to gain a skilled, proven workforce
- Provides access to data and knowledge



**Leverage Investment**



Science & Technology Facilities Council

Central Laser Facility





# Challenges of Industrial Engagement

- Deadlines are often different: Academic vs Business
- Being fit for purpose
  - It is good enough to get the results vs it is a robust cost effective commercial product
- Different reasons for doing the work
  - academic success and reputation vs the bottom line
- Intellectual Property
  - Publish or Patent debate
- Sustainability and long term vision



Science & Technology Facilities Council

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# Connection Mechanisms

- Knowledge Transfer Network
- Innovate UK
  - CR+D, Catapults, KTP
- RCUK
  - EPSRC CIM LbMP
- Trade Associations eg. AILU
- UKTI and FCO
- H2020
- EPIC
- Linked In
- ...



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