



The future of manufacturing:
Horizontal Innovation™ -
taking tech from one sector
to another

Join at sli.do
#HorizontalInnovation



What is Horizontal Innovation™

The effective transfer of knowledge and technology from one sector to another

Why now?

Horizontal Innovation™ does currently happens in the UK, but on an ad-hoc basis.

The IET believes there is significant room for an increased and improved national approach

An approach that is based upon pre-existing technologies and processes

This has the potential to deliver huge benefits both in time to market and relative costs

Whilst addressing key societal and business issues





Solving our biggest challenges

It is only by coming together, sharing our experiences and collaborating will we solve some of societies biggest challenges

Manufacturer and designers are already doing this

But we can and need to do more to solve these global challenges

Challenges such as...



Challenges such as...



Challenges such as...



Challenges such as...



Challenges such as...





**Some of greatest challenges
may already have an answer...**

Help us find them

Join at

slido.com

#HorizontalInnovation





Dave Seaward
Stewart Lowth
Matthew Burke
Philippa Ryan

Ask questions at sli.do #HorizontalInnovation



Dave Seaward

Ask questions at sli.do #HorizontalInnovation



IET Horizontal Innovation Webinar

Prepared by

Dr Dave Seaward

10th June 2021

3P's Robotic Capsule Filler Core to UK Pharma Grand Challenge 2 - "The Pharmacy of the Future"

About 3P and the Presenter?

- An Employee Owned, UK, automation company

- Highly Engineered, Custom Equipment, Project based
- Scalable assembly for new product development
- Focus on Pharma and MedTech
- ~£10million turnover ~85+staff (~65+ professional engineers)
- Doubled in size since 2018

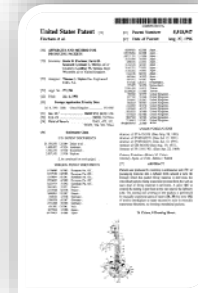
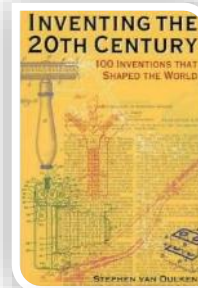


- Dave Seaward - 3P Founder
- 154 Patent applications

- Source: FreePatentsOnline
- Including Pyramid Teabag
 - A re-imagined "Jubbly"

- Recent 3P Awards

- IET Horizontal Innovation Award
- Queen's Awards for Innovation 2020
- Queen's Award for Exports 2021
- UK Business Hero 2020
 - Design, Produced and donated 30,000 visors to front line staff



850+
YEARS
ENGINEERING
EXPERIENCE

500+
GLOBAL
PROJECTS

THE QUEEN'S AWARDS
FOR ENTERPRISE:
INNOVATION
2020

15% YEAR ON YEAR
GROWTH

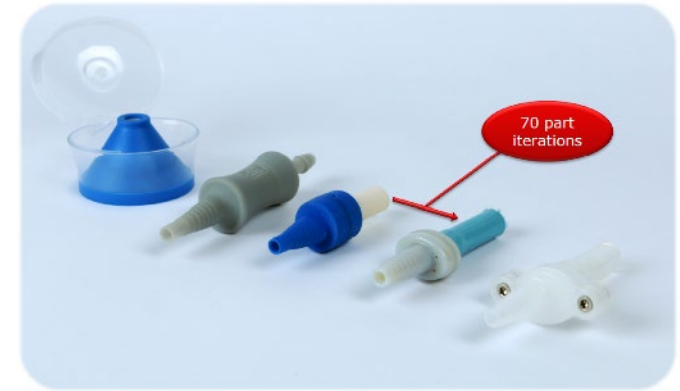
THE QUEEN'S AWARDS
FOR ENTERPRISE:
INTERNATIONAL TRADE
2021

300+ PATENTS &
NAMED
INVENTORS

From Mayonnaise to Catheters



Horizontal Innovation



United States Patent
Younos et al.

(12) Patent No.: **US 9,604,252 B2**
(43) Date of Patent: **Mar. 28, 2017**

(54) **PROCESS FOR COATING CONTAINERS**

(71) Applicant: **Comeco, Inc.**, Englewood Cliffs, NJ (US)

(72) Inventors: **Omer Bin Younos**, Vhardsing (NL); **Christopher Norman Williamson**, New (GB); **Geoffrey Williams Vernon**, Fringford (GB); **Luca Mario Vitale**, Hahnenwiese (DE) (GB)

(75) Assignee: **Comeco, Inc.**, Englewood Cliffs, NJ (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) to 0 days.

(21) Appl. No.: **14896,808**

(22) PCT Filed: **May 15, 2014**

(86) PCT No.: **PCT/EP2014089951**
§ 371 (c)(1),
(2) Date: **Nov. 12, 2015**

(87) PCT Pub. No.: **WO2014187725**
PCT Pub. Date: **Nov. 27, 2014**

(65) **Prior Publication Data**
US 2016/0074931 A1 Mar. 17, 2016

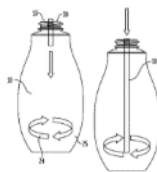
Related U.S. Application Data

(60) Provisional application No. 61/825,159, filed on May 20, 2013.

(51) **Int. Cl.**
B05D 7/22 (2006.01)
B05D 7/09 (2006.01)
(Continued)

(52) **U.S. Cl.**
B05D 7/22 (2013.01); **B05D 7/09** (2013.01); **B05D 1/08** (2013.01); **B05D 1/02** (2013.01);
(Continued)

3 Claims, 7 Drawing Sheets
(Continued)



United States
Patent Application Publication
Denman et al.

(10) Pub. No.: **US 2019/0366038 A1**
(45) Pub. Date: **Dec. 5, 2019**

(54) **URINARY CATHETER**

(71) Applicant: **Rainbow Medical Engineering Limited**, Broynton, Hertfordshire (GB)

(72) Inventors: **Clive Denman**, Lymington (GB); **Louis Gerard Marini**, London (GB); **Alan Lyndell Poole**, Old Harlow (GB); **David Seward**, Warwick (GB)

(75) Assignee: **Rainbow Medical Engineering Limited**, Broynton, Hertfordshire (GB)

(21) Appl. No.: **16446,774**

(22) PCT Filed: **Dec. 8, 2017**

(86) PCT No.: **PCT/GB2017053494**
§ 371 (c)(1),
(2) Date: **Jun. 7, 2019**

(80) **Foreign Application Priority Data**
Dec. 8, 2016 (GB) 1620223
Nov. 27, 2017 (GB) 1719368.7

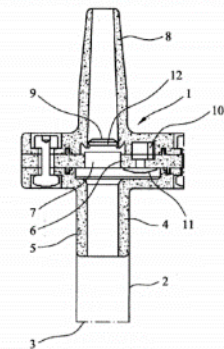
Publication Classification

(51) **Int. Cl.**
A61M 25/00 (2006.01)
A61M 27/00 (2006.01)

(52) **U.S. Cl.**
A61M 25/007 (2015.01); **A61M 2025/0075** (2015.01); **A61M 25/0075** (2013.01); **A61M 27/008** (2015.01)

ABSTRACT

There is described a urological device comprising one or more valves within a valve housing, external to the body when in use, with means for connection to an in-dwelling catheter and a means for connection to a urine collection device for the reduction of Catheter Associated Urinary Tract Infections (CAUTIs), the valve characterised by having a higher opening pressure than closing pressure, and the urological device having one or more valves available from a closed position to an open position in response to applied urological intra-substantial pressure, and wherein the device is provided with a vent to prevent siphoning action from the urine collection device and wherein the valve has a region of coaption and the number of valves is varied to provide opening pressures matched to one or more intra-substantial pressures in one or more patient groups.



From Man powered flight to Vaginal Rings

- Success through rapid iteration – so called “fail early, fail fast”



By NASA - <http://www.dfrc.nasa.gov/Gallery/Photo/Albatross/HTML/ECN-12604.html>, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=3633499>

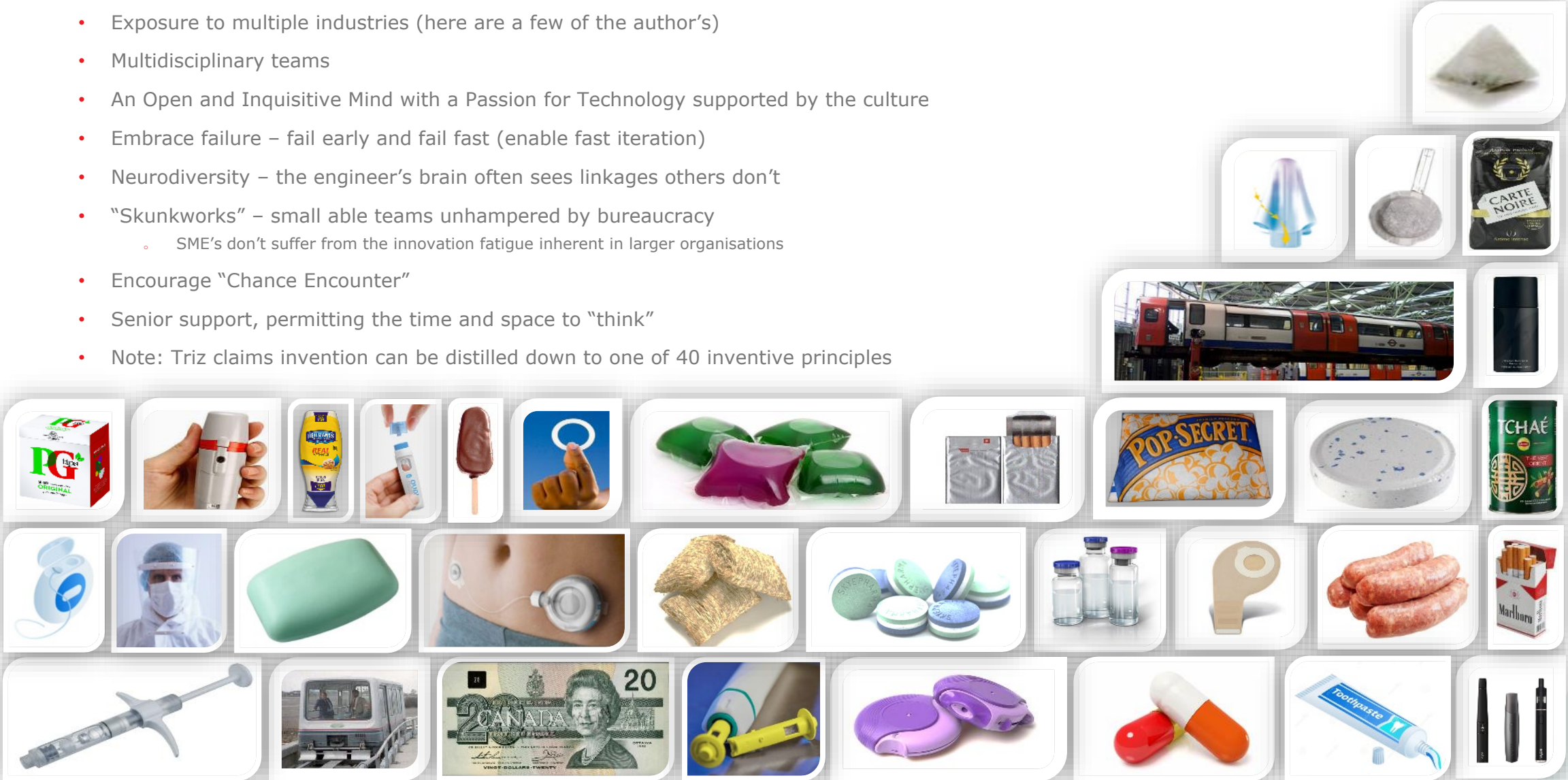
Both Developed Using
“Fail-Early Fail-Fast”



Image: International Partnership of Microbicides

Horizontal Innovation - Enablers

- Exposure to multiple industries (here are a few of the author's)
- Multidisciplinary teams
- An Open and Inquisitive Mind with a Passion for Technology supported by the culture
- Embrace failure – fail early and fail fast (enable fast iteration)
- Neurodiversity – the engineer's brain often sees linkages others don't
- "Skunkworks" – small able teams unhampered by bureaucracy
 - SME's don't suffer from the innovation fatigue inherent in larger organisations
- Encourage "Chance Encounter"
- Senior support, permitting the time and space to "think"
- Note: Triz claims invention can be distilled down to one of 40 inventive principles



CONTACT US

 +44 (0) 1926 408 933

 info@3pinnovation.com

 www.3Pinnovation.com

3P innovation Ltd. Tournament Fields, Bosworth Avenue, Warwick, CV34 6UQ, UK



Stewart Lowth

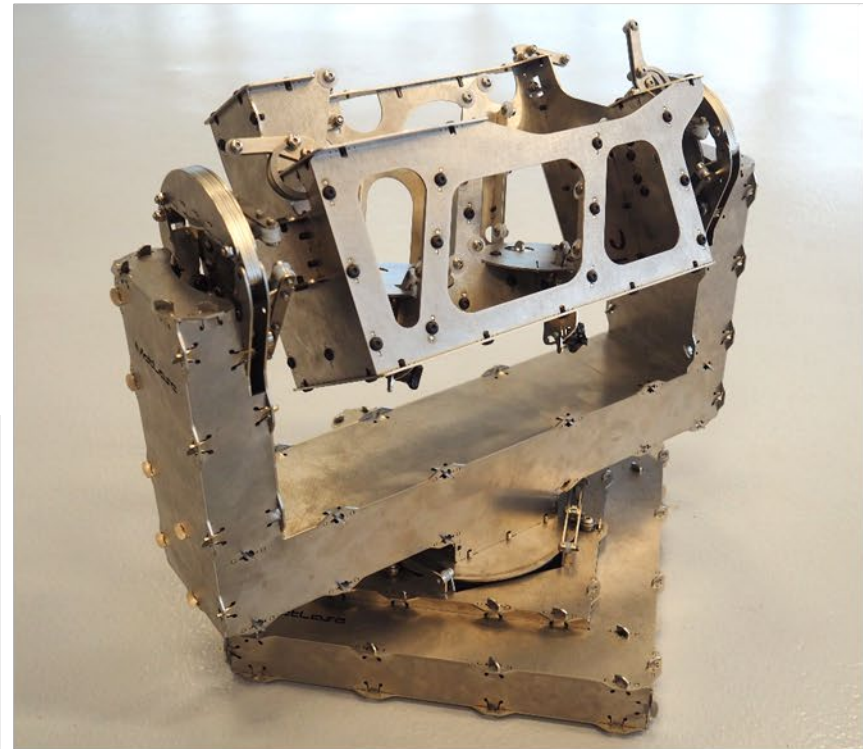
Ask questions at sli.do #HorizontalInnovation



Rapid Horizontal Innovation: VentilatorChallengeUK Case Study

Presented by: Dr Stewart Lowth – MetLase, Product Development and Innovation Manager

- Established in 2007 as a joint venture between Unipart and Rolls-Royce
- Our founding vision was one of cross-sector horizontal innovation
- 30 Engineers servicing a wide array of industries
- An “Engineering first” business, that makes tooling to solve complex manufacturing challenges
- Our core technology uses patented laser-cut joining features to build precision sheet stainless steel structures without welding
- More recently, we developed a unique digital platform for adding intelligence to our tooling



Customised Solutions



Rapid Tooling Development



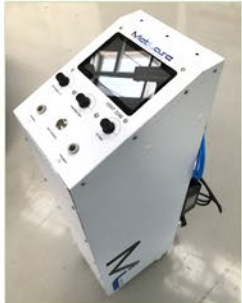



Digital Manufacturing

VentilatorChallengeUK

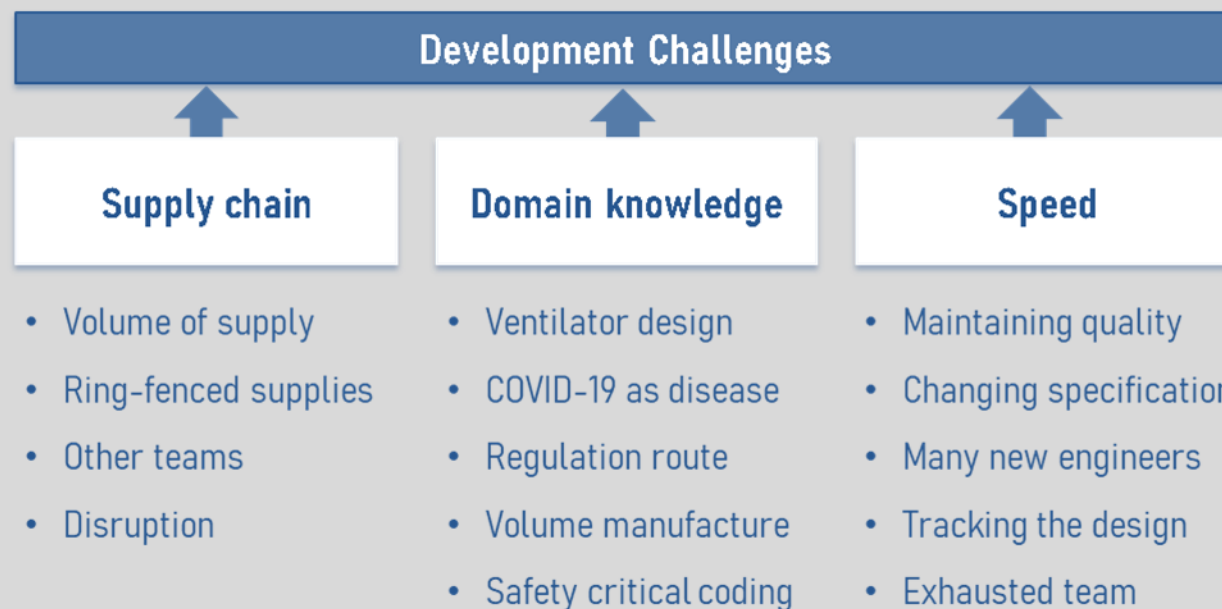
The wide-reaching role of MetLase within the programme

MetLase
A JOINT VENTURE BETWEEN ROLLS-ROYCE AND UNIPART

- In the spring of 2020 the UK Government challenged UK manufacturing to support the need for mechanical ventilators due to COVID-19
- The UK Government and medical regulator established a three pillar approach
- Metlase supported four ventilator programmes during the VentilatorChallengeUK

MetLase, Unipart & Rolls-Royce	Cambridge Consultants & MetLase	Meggitt	Smiths, GKN and Rolls-Royce
Pillar 3 system (RMVS)	Pillar 3 system (RMVS)	Pillar 3 system (RMVS)	Pillar 2 system
			
MetLase developed system	Manufacturing partner, develop production	Support design of external casing	Design and build 74 assembly benches

- The Government's aim was for 30,000 ventilators within a few months, this gave the MetLase team a number of challenges that spread across all four development programmes

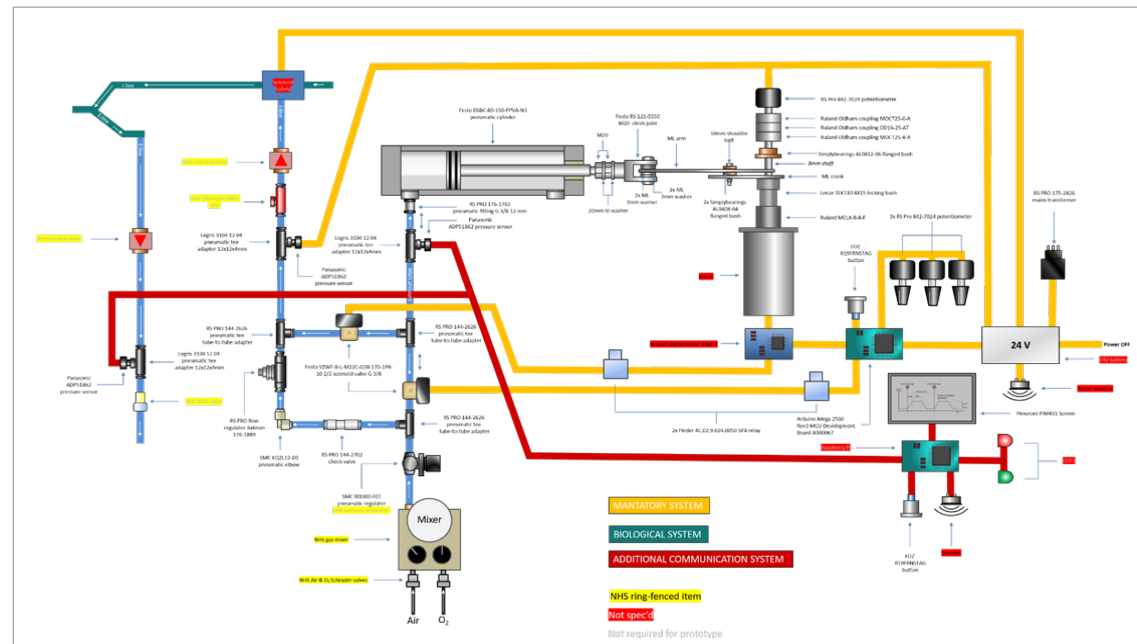
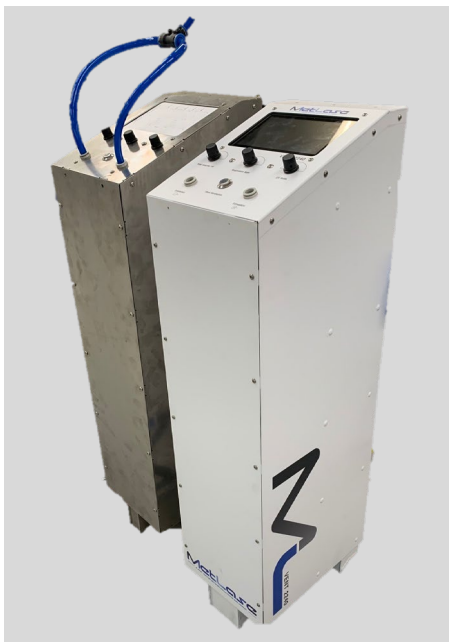


- We used horizontal innovation to overcome these issues, pulling in expertise to support and bolster the team where needed

The MetLase Ventilator

Partners - Uipart Manufacturing, Uipart Digital, Uipart Rail, Rolls-Royce, The Medical Catapult, and Sheffield Teaching Hospital

- Call-to-arms Friday lunchtime, present concept to medical regulator on Monday.
- We developed an innovative “dosed-volume” ventilator using modified industrial components
- Supports forced ventilation, assistive breathing, Mandatory Minute Ventilation (MMV) modes, along with an adjustable Constant Positive Airway Pressure (CPAP).
- The team produced two prototypes: the first taking ten days, and the second eight days later



MetLase

A JOINT VENTURE BETWEEN ROLLS-ROYCE AND UNIPART

Web: www.metlase.com
Email: sales@metlase.com
Telephone: 0114 383 0610

Dr Stewart Lowth

Product Development and Innovation Manager

Stewart.Lowth@MetLase.com

Mobile: 07584 643 091



We are located on the Advanced Manufacturing Park (AMP) in South Yorkshire, on the border of Sheffield and Rotherham.

Directions

The AMP is just off junction 33 of the M1, and clearly signed from the A630 Sheffield Parkway.

Satnav: please use 'S60 5TZ' which will bring you to our building. Enter through the AMP Technology Centre main gate and park in front of our building, shown below.





Matthew Burke

Ask questions at sli.do #HorizontalInnovation



WILLIAMS ADVANCED ENGINEERING

Formed in 2010

Spin-out from the Williams Formula One business, now independently owned

300+ staff

Key capabilities:

- Lightweight materials and structures
- Aerodynamics and thermodynamics
- Electrification – energy systems and technologies

Sectors include:

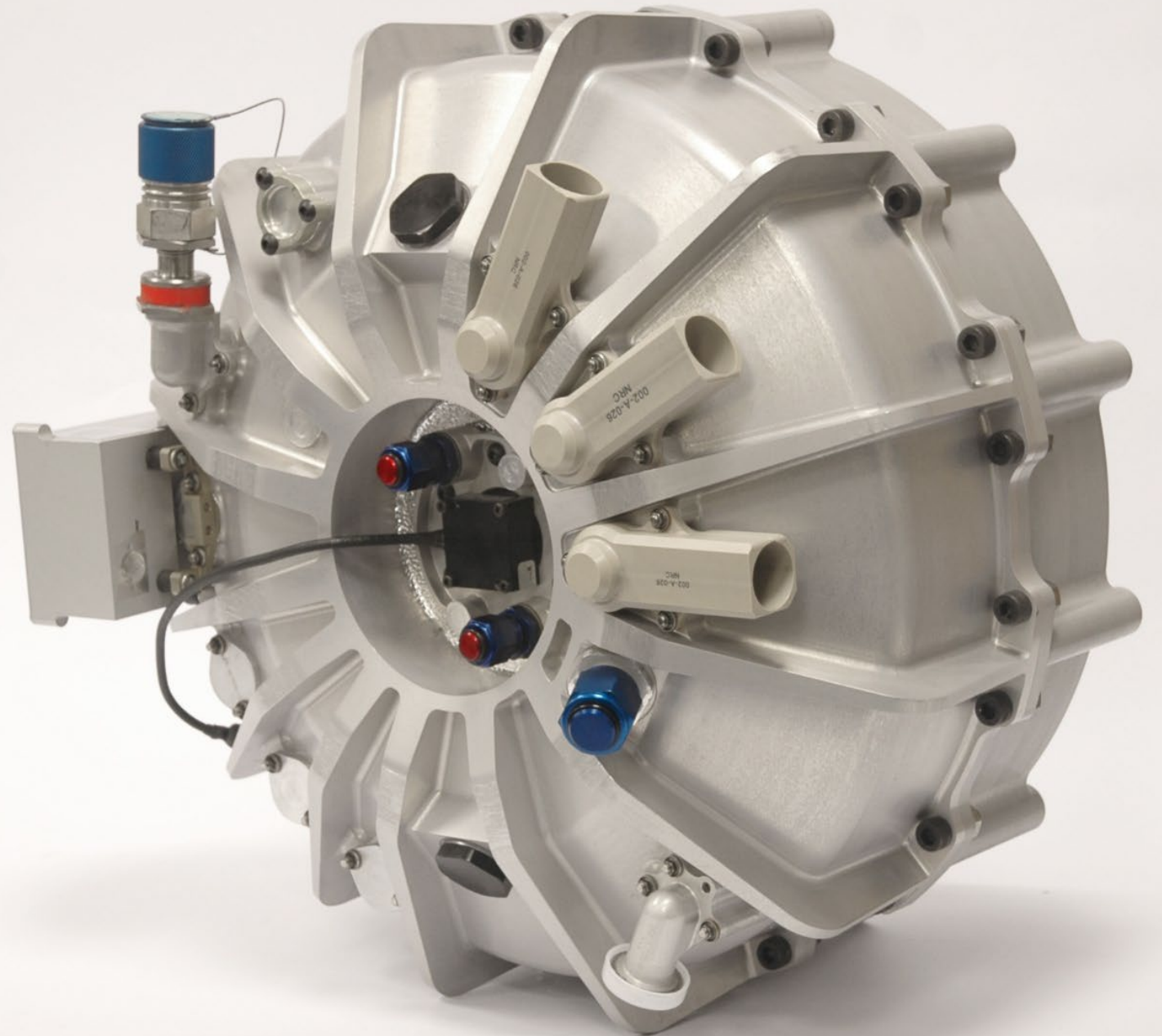
- Automotive and Motorsport
- Defence
- Aerospace
- Energy

FLYWHEEL ENERGY STORAGE

Intended for use by Williams F1 KERS

Mobile system used in buses and trams

Exited to GKN Land Systems in 2014



FLYWHEEL ENERGY STORAGE

Same composite rotor technology as
the mobile flywheel

Stationary system used in renewable
energy micro grids

Exited in 2014





BABYPOD

BABYPOD

Design and manufacture by WAE

Carbon fibre construction

Lightweight, compact and easy to handle

Safe – withstands a 20-G shock



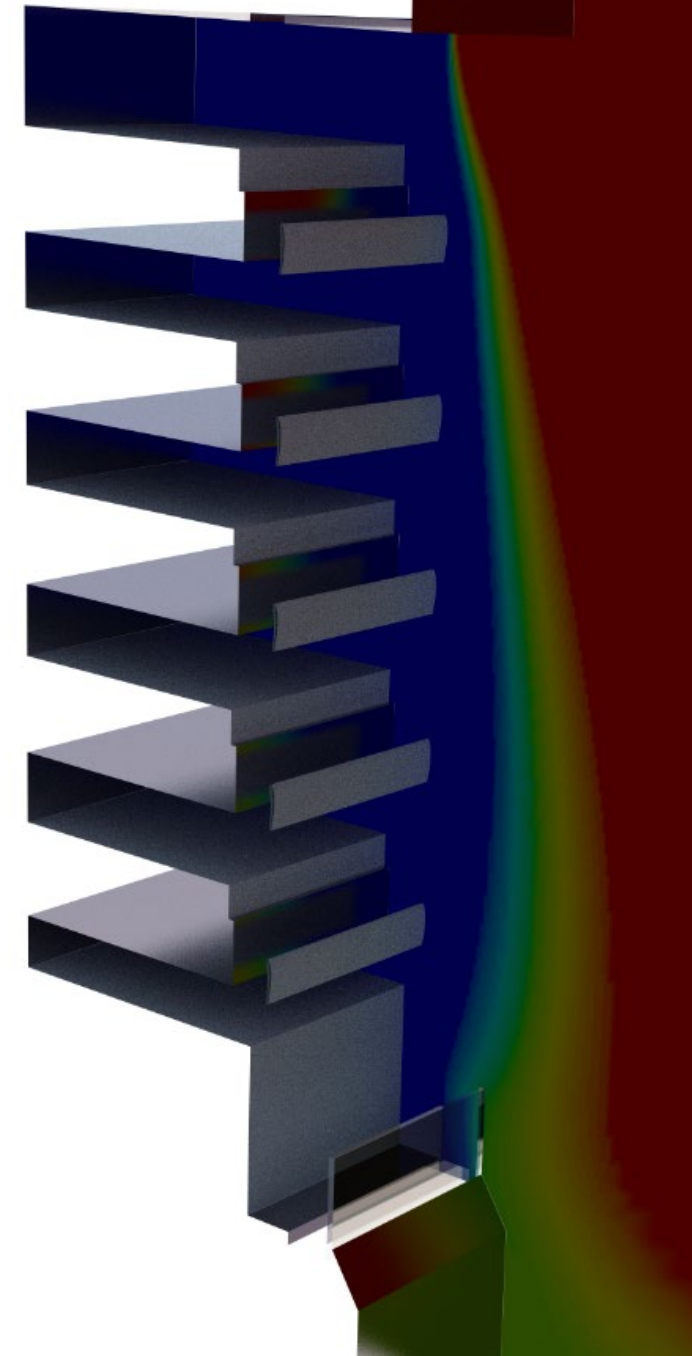
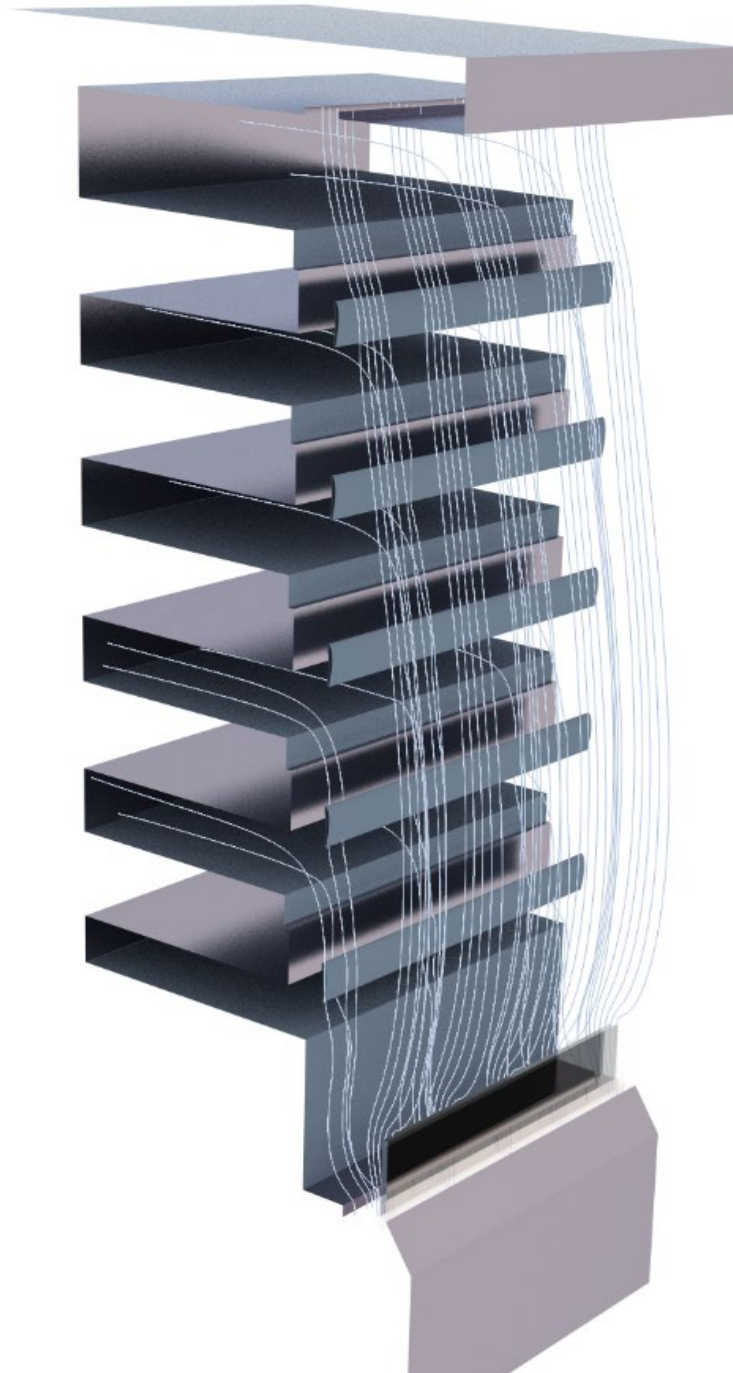


AEROFOIL SHELF EDGE TECHNOLOGY

Reduces cold air spill, lowering
energy consumption and
warming supermarket aisles

AEROFOIL SHELF EDGE TECHNOLOGY

CFD modelling used to optimise aerofoil
blade design and installation



AEROFOIL SHELF EDGE TECHNOLOGY

1.4 million aerofoils installed in more than 4,000 stores across 10 countries

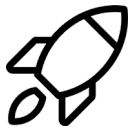
At least 15% energy saving in store



FORESIGHT WILLIAMS TECHNOLOGY FUNDS



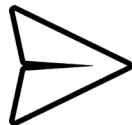
EARLY STAGE VENTURE CAPITAL



LAUNCHED IN NOVEMBER 2016



£66M RAISED, £44M DEPLOYED


























**HARDWARE TECHNOLOGY & INDUSTRIAL
SOFTWARE FOCUS**



**Foresight
WILLIAMS**

FORESIGHT WILLIAMS TECHNOLOGY FUNDS

 £1.2m* Remote management of gas networks	 £1.6m Laser dispersion for gas detection	 £1.7m Satellite imagery and data analysis	 £3.2m* Clean propellant aerosol valve technology	 £1.1m Automotive AI software platform	 £2.1m Booms and antennas for nanosatellites
 £1.9m* Smaller e-bike powertrain technology	 £3.0m* Collaborative robot arms for SME manufacturing	 £1.5m 3D printed bionic prosthetic arms	 £3.3m* Mass spectrometry using light	 £2.0m Remote monitoring of the electrical grid	 £2.5m* Metrology for automated manufacturing
 £2.75m*^V Post processing for 3D printing	 £1.6m Smart hot water tanks	 £1.5m Flexible ultrasound for industrial applications	 £2.0m Subsea infrastructure survey robotics and AI	 £1.5m AR/VR collaboration for engineering design	 £0.7m* Sophisticated camera for industrial analysis
 £1.5m Flow sensors	 £1.1m Immersive 3D audio soundbars	 £0.8m GaN semiconductor chip power devices	 £0.8m AI-driven simulation software	 £0.8m Semiconductor laser company	<i>To be announced</i>

SEEKING INVESTMENT? WHAT I LOOK FOR



DEEP MARKET UNDERSTANDING

First market, first customers, sales cycle



CUSTOMER ENGAGEMENT

Working with the decision makers



SEEKING PAID TRIALS

Reduced reliance on grants



DISCOVERY TO DELIVERY CULTURE

Ready for the transition from technology to product



Philippa Ryan

Ask questions at sli.do #HorizontalInnovation

The UK innovation ecosystem

Policy



Strategy



Fund



Connect




Collaborate




Philippa Ryan MIET
Knowledge Transfer Adviser






Find funding ▶

UKRI convenes, catalyses and invests in close collaboration with others to build a thriving, inclusive research and innovation system.



NOTE This is the first phase of our new website – let us know if you have [feedback](#) or would like to [help us test new developments](#).

Highlights



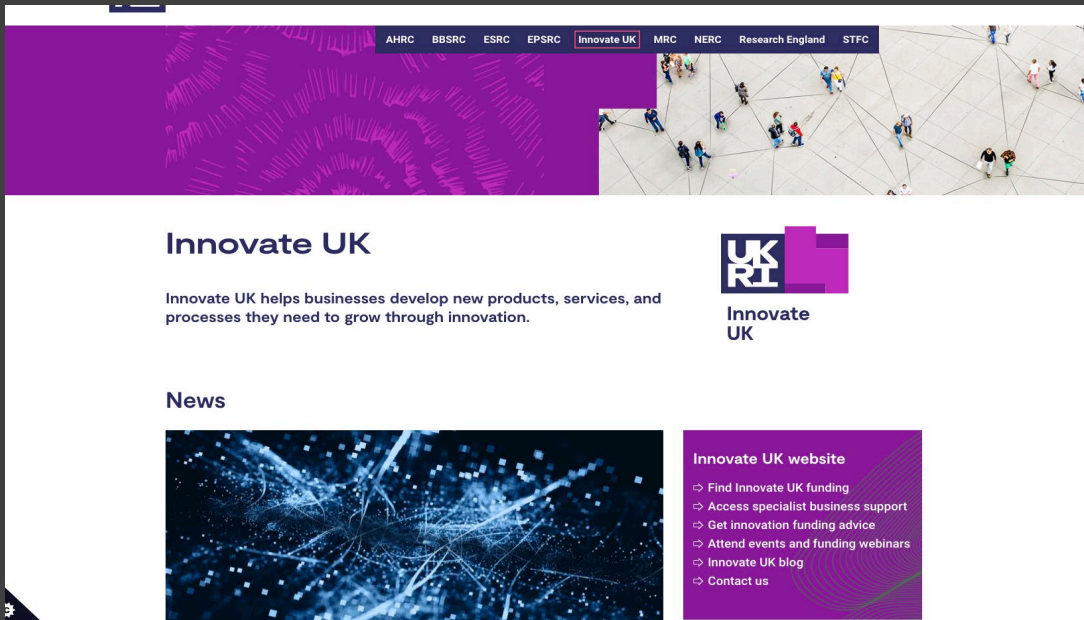
UKRI Research Councils

Key areas of investment:

- Industrial Strategy Challenge Fund
- Global Challenges Research Fund
- Strategic Priorities Fund
- Strength in Places Fund
- Future Leaders Fellowships
- Fund for International Collaboration

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

<https://www.ukri.org/>



Innovate UK

- is the UK's innovation agency
- connects businesses to the people that can help them, and funds business and research collaborations in all economic sectors, value chains and UK regions to accelerate innovation

Biomedical Catalyst Grant

Automotive Transformation Fund

ISCF Smart Sustainable Packaging

Creative Industries Fund

Hydrogen Transport Hub

Clean Maritime Demonstration Competition

IETF Deployment of Energy Efficiency Technologies

Driving the Electric Revolution: Supply Chains for Net Zero

SMART grants for R&D

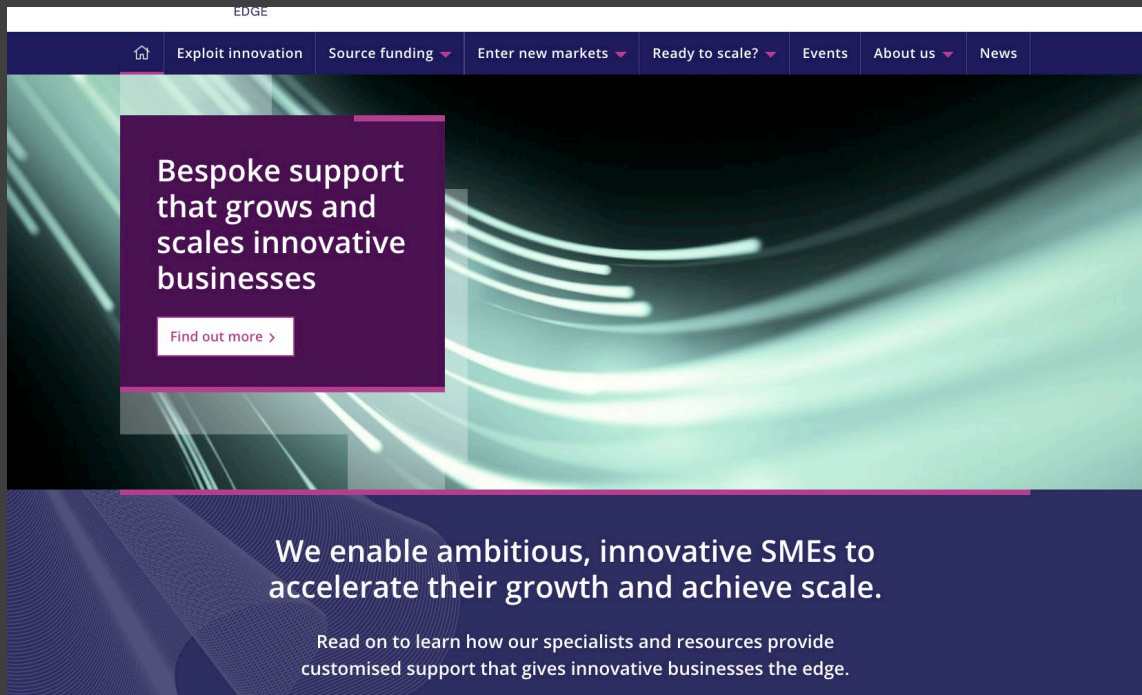
Knowledge Transfer Partnerships

Innovation Loans

SBRI Competitions

Young Innovator Awards

<https://www.ukri.org/councils/innovate-uk/>



1-2-1 support

IP audit tool

Partnership tool

Innovation Management

Scale Up Programme

Events

Innovation News

Innovate UK Edge

Delivers innovation and growth support.

Grow your business by protecting and harnessing IP, improving innovation management and connecting to the innovation ecosystem globally.

Innovate UK EDGE offers a range of services to help ambitious, innovative SMEs scale up and grow. We help businesses:

- Exploit new innovations
- Enter new markets
- Source funding

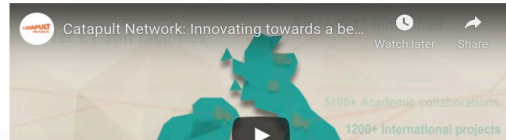
<https://www.innovateukedge.ukri.org/>

BUILDING LONG-TERM NATIONAL RESILIENCE



WELCOME TO THE CATAPULT NETWORK

The Catapult Network supports businesses in transforming great ideas into valuable products and services. We are a network of world-leading technology and innovation centres established by Innovate UK. We deliver impact across the UK



High Value Manufacturing
Energy Systems

Compound Semiconductor Applications

Digital

Cell and Gene Therapy

Connected Places

Medicines Discovery

Offshore Renewable Energy

Satellite Applications

CATAPULT

Network

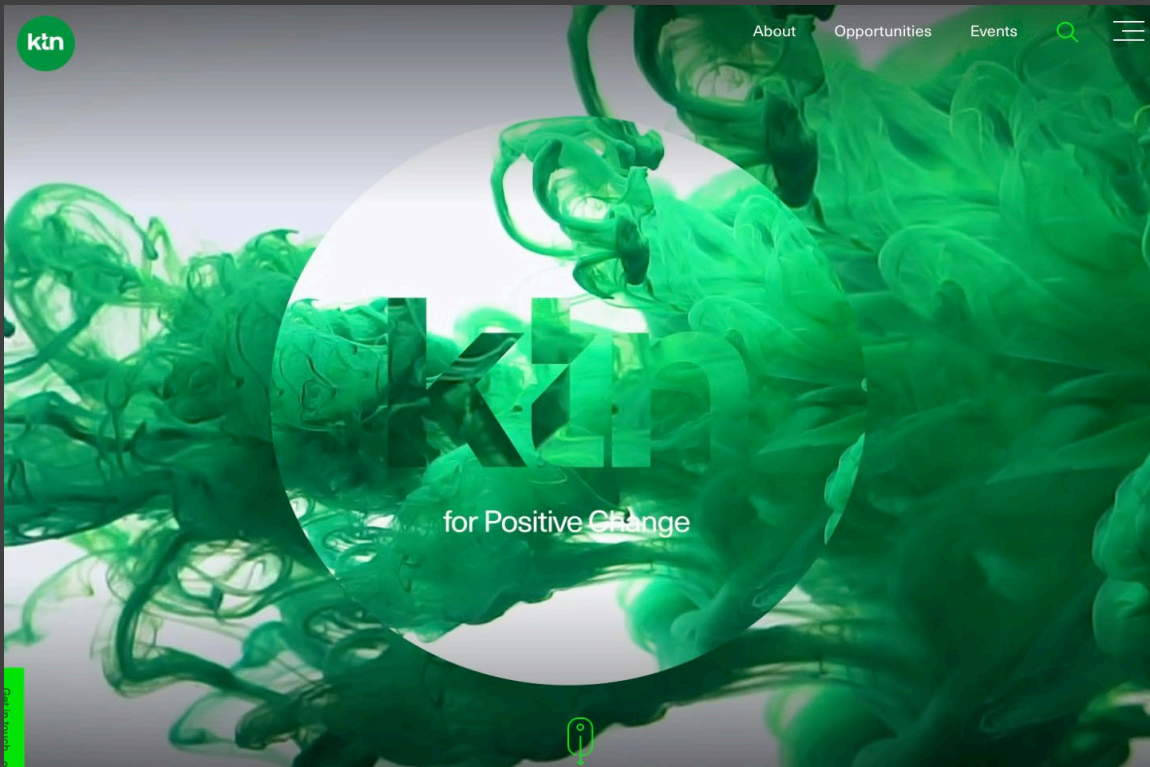
The Catapult Network supports businesses in transforming great ideas into valuable products and services.

We are a network of world-leading technology and innovation centres established by Innovate UK.

We deliver impact across the UK economy, enabling businesses to thrive in global markets.

**ACCELERATING BUSINESS GROWTH,
STIMULATING MARKETS**

<https://catapult.org.uk/>



Updates on funding opportunities
Showcase events for networking
News, Case Studies
Reports, Perspectives
Innovation Networks
Innovation Programmes



KTN exists to connect innovators with new partners and new opportunities beyond their existing thinking – accelerating ambitious ideas into real-world solutions.

Agri-food	Robotics & AI	Health
Chemistry	Sensors	Infrastructure
Design	Transport	Materials
Electronics	Biotechnology	Quantum
Geospatial	Creative Industries	Security & Defence
Industrial Maths	Digital	Space
Manufacturing	Energy	Water
Photonics		

<https://ktn-uk.org/>

Innovation Networks



Communities that help shape our shared future

Through our Innovation Network programme, we've united some of the best minds and greatest thinkers from across the UK in areas of innovation, development and new technologies. Together, they're charged with finding answers to some of the world's most significant challenges, to help introduce positive change and shape our collective future.

Why have we done this? Thought leadership is something the UK is renowned for around the globe. We've always been at the coalface of ideas and innovation. By pooling the expertise we have at our fingertips, we have the potential to positively affect the lives of people all over the world, as well as those on our doorstep.

And we're doing this because we know communities like this are far greater than the sum of their parts. Specialist collaborations produce results that just wouldn't be possible with people thinking and working in isolation. They share their deep understanding and expertise to come up with creative and practical ideas that help make considerable leaps in how we approach our shared problems.

And you could be part of it. If you're working in a speciality that could help affect positive change, talk to us today, and we'll help connect you with a like-minded community that want to change the world for the better.

Current KTN Innovation Networks;

AI for Services
Battery Systems
Commercialising Metamaterials

Related Content

AI for Services
Battery Systems
Metamaterials
Decarbonising Ports
Geospatial Insights
Hydrogen Economy
Made Smarter
Medicine Manufacturing
Microbiome
Nature Inspired Solutions
Neurotechnology
Robotics and AI

AI for Services
Battery Systems
Commercialising
Metamaterials
Decarbonising Ports and
Harbours
Geospatial Insights
Hydrogen Economy

Medicines
Manufacturing
Microbiome
Nature Inspired
Solutions
Neurotechnology
Robotics and AI
Made Smarter



Innovation Networks

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Specialist collaborations produce results that just wouldn't be possible if people are thinking and working in isolation. They share their deep understanding and expertise to generate creative and practical ideas that aim to find answers to some of the world's most significant challenges.

<https://ktn-uk.org/programme/innovation-networks/>

Are you looking for new business opportunities for your technology?

Do you have the radical technology needed by global players in rapidly growing sectors?

Find out what large innovation challenges these key players are facing and put forward disruptive solutions that your new and cutting edge technologies could deliver.

KTN-iX™ provides you with the opportunity to become directly linked to, or collaborate with, key industry stakeholders who are actively seeking the most innovative solutions to help them achieve their full potential.



See our latest challenges

i3P utility strike avoidance on Highways England network



The innovation exchange is looking for innovative solutions for avoiding the striking of utility assets during the maintenance and construction of Highways England's Strategic Road Network. The winning business(es) in this competition will be given an opportunity to present their solutions to a group of major infrastructure clients, with the potential of an opportunity to deliver a demonstration of their solution with Highways England delivery partners.

16 days left

SELECT CHALLENGE

“Posting our challenges on KTN's Innovation Exchange has allowed us to have a cross-sectoral approach and added an element of reach that has proved invaluable. The responses have allowed us to explore applying solutions from other sectors like medical X-Ray technology to some really tricky problems.”

Andy Cooney,

Technical Manager at Sellafield



KTN-iX™

KTN-iX™ (KTN-innovation eXchange)

is a cross sector program supporting innovation transfer by matching industry challenges to innovative companies from other sectors. It does this through putting large businesses with technical needs in contact with companies who have the right innovative solutions, for faster development of novel solutions.

<https://www.ktninnovationexchange.co.uk/>



We connect regional,
national and global
innovation

Our **Global Alliance** programme drives international collaborations with governments, societies, enterprises, institutions and people from every corner of the globe.

Global Expert Missions (GEMs), funded by Innovate UK and delivered by KTN, drive the sharing of expertise across borders and foster global collaboration. They help to build international strategic partnerships and provide insight into innovation opportunities for the UK.

<https://ktn-uk.org/global-alliance/>

Unique, three-way collaborations powering innovation

For 45 years, Knowledge Transfer Partnerships (KTPs) have been helping businesses innovate for growth.

They do this by connecting businesses that have an innovation idea with the expertise to help deliver it. Right now around 800 businesses, 100 knowledge bases and over 800 graduates are involved in KTPs – collaborative, three-way partnerships creating positive impact and driving innovation.

Each KTP is project managed by a [KTP Associate](#) – a talented graduate or post graduate. See current vacancies [here](#).

The KTP programme is complemented by the [Management KTP Programme \(mkTP\)](#), focused on helping businesses build resilience, adaptability and growth by changing culture or expanding management capability. Find out more [here](#).

The [KTP Best of the Best Awards](#) are an annual celebration of the very best KTP partnerships. This year's event will take place on Thursday 23rd September 2021, online.



Connect UK business with the experts

Knowledge Transfer Partnerships

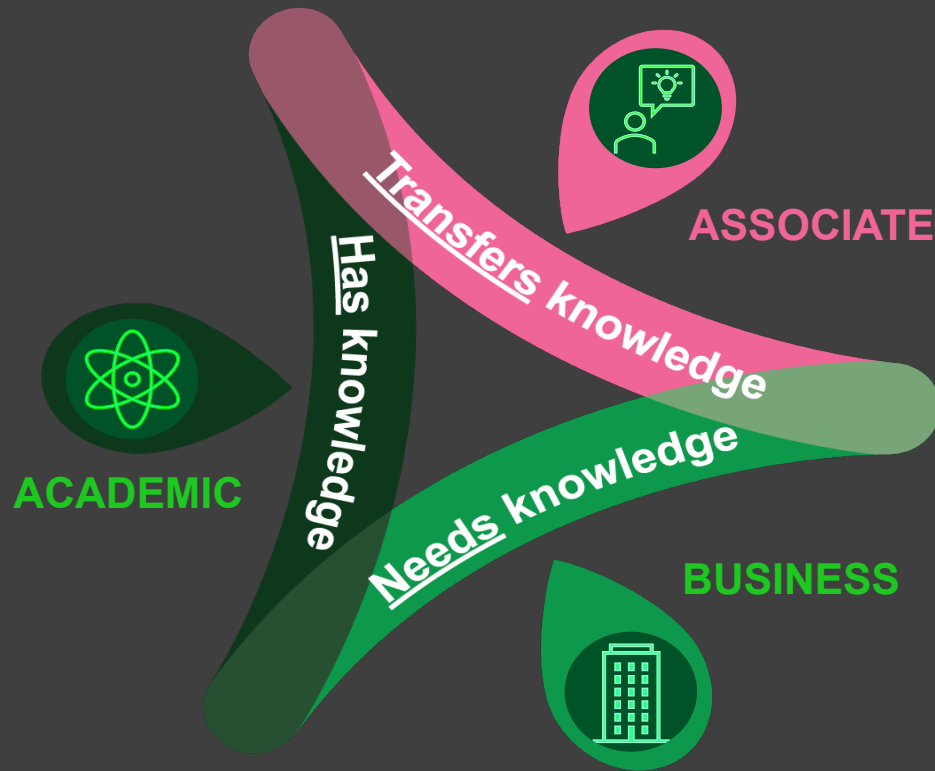
build long-lasting connections and collaborations between the worlds of business and research.

Graduates, businesses and academic institutions come together to transfer knowledge and solve challenges through innovation.

Innovation is the lifeblood of any business, but how do you access and embed the cutting edge expertise needed to make it happen?

A Knowledge Transfer Partnership (KTP) project may be the answer.

<https://www.ktp-uk.org/>



The Best KTP 2020

Aquacheck Engineering, Manchester Metropolitan University and Dario Chiantello revolutionised the traditional standpipe by drawing on expertise in electronic engineering and embedded systems to develop a smart water standpipe that utility companies can use to remotely monitor water use.



Embed new capability

Knowledge Transfer Partnerships (KTPs) link ambitious businesses with the UK's world class knowledge bases to deliver innovation projects led by inspired graduates:

- Embed expertise, generate new knowledge, expand capability and foster a culture of innovation
- Drive competitive advantage through accelerated innovation and the creation of Intellectual Property
- Gain direct and cost-effective access to the UK's world-class research facilities

<https://www.ktp-uk.org/>

Thank you for listening

Philippa Ryan

KTA East Midlands

philippa.ryan@ktn-uk.org

07860 863649

The KTN logo is displayed in a bold, black, lowercase sans-serif font. It is centered within a large, semi-transparent blue circle that occupies the right side of the slide. The letters 'k', 't', and 'n' are connected at the base, and the 't' has a distinctive shape with a vertical bar on its left side.

ktn

Join at

slido.com

#HorizontalInnovation



Meet the Panel



**Jeremy Hadall
(Moderator)**

Chair, IET Design
and Production
Sector Executive
Committee



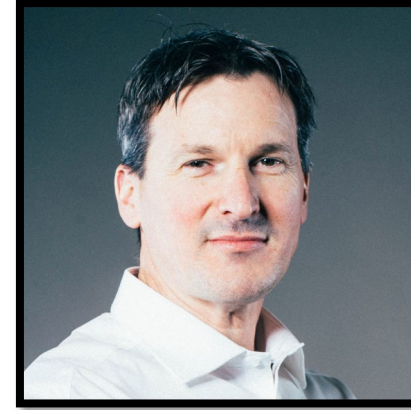
Dr Dave Seaward

Director,
3P Innovation Ltd



Stewart Lowth

Chartered
Mechanical
Engineer and the
Product
Development
and Innovation
Manager, MetLase



Matthew Burke

Head of
Technology
Ventures,
Williams
Advanced
Engineering



Philippa Ryan

Knowledge
Transfer Advisor,
The KTN



Ask questions at sli.do #HorizontalInnovation

Your views are important to us

We welcome your views and collaboration both today and beyond to help us achieve this. This ensures that we can keep professionals and wider society reliably informed about the key issues of today, while horizon-scanning to understand the trends and developments that will impact the engineers of the future.

To get involved contact us sep@theiet.org