

# Metrology for Economic Recovery from the COVID-19 Pandemic

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# NPL's COVID-19 Response

- Delivering an agile and prompt response
- Giving independent advice to UK industry
- Maintaining critical services
- Digitally enabled our workforce
- Measurement for Recovery - Enabling innovation to support UK industry recovery and growth

Read our full response: [npl.co.uk/covid-response](https://npl.co.uk/covid-response)



**Measurement  
for Recovery**

Building confidence  
in the future

# Our Priorities - 2020



**PEOPLE SAFE & SECURE**

**RESPOND**

**'Support UKs COVID-19 RESPONSE and Critical Infrastructure as a NATIONAL LAB'**

**DELIVER**

**'Deliver Programmes as effectively as possible maximising impact'**

**IMPROVE & PREPARE**

**'Ensure we maximise opportunity to improve to deliver even more effectively as part of UK recovery'**

**RE-IMAGINE**

**'Ensure we are prepared for the New Normal (whatever it is?)'**

**PRIORITY**



Overall, the UK economy, measured by gross domestic product (GDP), shrank by a record 19.8% in the second quarter (April to June) of 2020, following the start of the first lockdown on 23 March. By September 2020, GDP was still down 8.2% compared with February

Source:

<https://www.ons.gov.uk/economy/economicoutputandproductivity/output/articles/theimpactofthecoronavirussofartheindustriesthatstruggledorrecovered/2020-12-09>

# Measurement for Recovery - Enabling innovation to support UK industry recovery and growth



The programme brought together the laboratories that make up the UK's National Measurement System:

- The National Measurement Laboratory (NML), hosted at LGC
- NEL (formerly the National Engineering Laboratory)
- NGML (National Gear Metrology Laboratory)
- NIBSC (National Institute for Biological Standards and Control)
- It was funded by the UK Government via the Department for Business, Energy and Industrial Strategy (BEIS)



Department for  
Business, Energy  
& Industrial Strategy



National Engineering  
Laboratory

# Measurement for Recovery - Enabling innovation to support UK industry recovery and growth



The programme was conceived to support UK industry in its recovery from COVID-19 with access to cutting-edge R&D, expertise and facilities to help solve analysis or measurement problems that couldn't be resolved using standard technologies and techniques.

The idea was to help boost productivity and competitiveness in UK industry, unleashing innovation and making the UK a great place to work and do business.



Department for  
Business, Energy  
& Industrial Strategy



National Engineering  
Laboratory

# M4R - How does it work



# 737 applications from 530 UK businesses



69% of companies said their **commercial opportunity has greatly or moderately increased** as a result of their M4R project



64% of applicants expect to see **increased sales in new or existing markets** as a result of their M4R project



62% of companies expect to **secure more investment for their project** from either external investment or internal sources



31% of applicants expect to **see reduced costs through decreased** production or material costs as a result of the M4R work



# Validating the quality of temperature sensors



Through Measurement for Recovery (M4R), NPL scientists compared the Isotech scanner, which operates at 100 °C, to their own homogeneity scanning equipment, which operates at 600 °C. Both scanners were used to measure the same two thermocouples which had well-characterised pre-existing damage, and the results were compared

“The project was excellent and gave us the evidence we needed to take our new product to customers. We have a long history with NPL and it’s always a privilege to work with scientists with such expert knowledge.”

**David Southworth, Sales and Marketing Manager, Isotech**



# Advising on the interpretation of the standard protocols and metrological issues



Xstrahl, an organisation which designs and delivers effective clinical and research solutions to advance radiation oncology, asked NPL to advise on the interpretation of the standard protocols and on metrological issues, prior to third party testing of their technology.

“The ability to engage with NPL to help support our EN60601-2-8 testing has been priceless. The Measurement for Recovery programme has helped us to meet the requirements for independent testing and assessment. For a UK medical device manufacturer dealing with the challenges of the current business environment, the support provided in terms of expertise, access to knowledge and the financial support have combined to bring significant benefit to our company.”

**Amanda Tulk - Chief Science Officer**

# Helping to deploy 5G at sea



NPL worked with JET Engineering on two Measurement for Recovery (M4R) projects. The first was the effect of sea state negatively impacting 5G performance, as the relationship between wave height and communication is presently unknown. The second was how to optimise use of the limited amount of electric power self-generated by 5G connected platforms that are deployed remotely and for extended durations. NPL provided technical support to help accurately define and provide improved solutions to help mitigate both of these challenges.

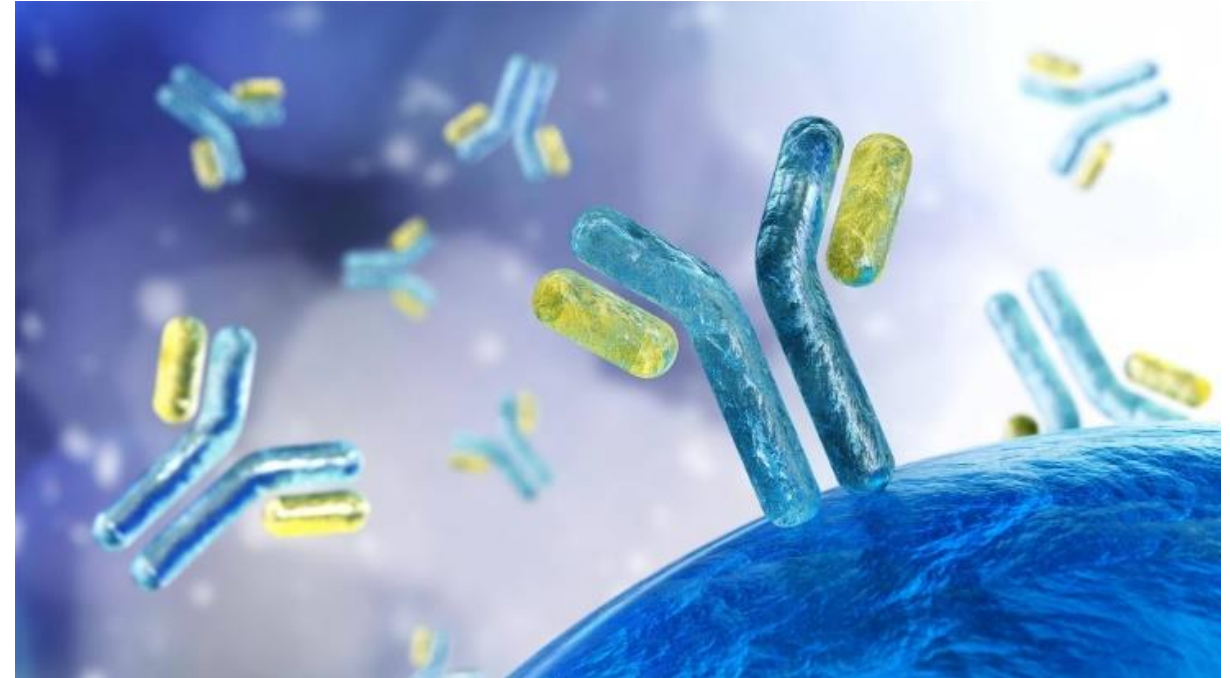
“As a business we are immensely grateful for the chance to work with NPL. Their assistance has helped us understand the options that will rapidly develop our product [...] Rarely do you meet such knowledgeable technical teams with such a significant wealth of information and access to decades of relevant research, as well as being so keen to create solutions for new problems. For example, the product enhancements proposed are expected to increase our communication range by 300%.” **James Thomas, CEO, JET**



# Validating a rapid analysis tools for researching monoclonal antibodies

Monoclonal antibodies (mABs) are larger and less stable than traditional therapeutic molecules – there is uncertainty about the shelf life of mABs and their stability, so they need careful measurement. BLOC Laboratories' software - QUBES - provides high sensitivity measurements of mAB stability by analysing fluorescence spectroscopy data. NPL ran an independent validation of the approach.

Well characterised protein materials were provided by BLOC for analysis. The NPL team measured these under controlled conditions at a range of temperatures and pH levels. The QUBES analysis was benchmarked against two well-established analysis techniques for measuring protein stability, circular dichroism and dynamic light scattering.



“This was a critical piece of work which we couldn’t do at the time. The measurement process, expertise, and data quality were all excellent. But the crucial thing was that it came from NPL, providing a seal of quality which opens doors and ensures customer take us seriously.”

**Christopher Pudney, Chief Scientific Officer at BLOC Laboratories Ltd.**

# A vision of the 2030s shaped by metrology

Maintaining world-class metrology capability



Responding to the digital revolution



National & International challenges



# Technology and Measurement Foresighting – Drivers of change

## Enterprise

Digital innovation to increase prosperity, productivity and growth, and also to enable equality and fairness

## Wellbeing

The health, security and safety of a growing populations with evolving social attitudes and values

## Sustainability

Reduced human impact on the climate, and management of natural resources

# Our Priorities – looking ahead



**Maintaining world-class metrology capability and leading-edge science**



**Connecting with stakeholders to respond to National & International challenges**



**Committing to Research Roadmaps – to use research to maximise our impact and optimise our facilities**



**Responding to the digital revolution – reimagining metrology for a digital world**

## Health

A healthy population is one of the nation's most important assets. It is valuable in its own right and also creates value for society. NPL will provide the required measurement infrastructure to accelerate innovation and technological advances that will enable the UK to diagnose, treat, cure and prevent a much wider range of disease than is currently possible.

## Environment

Human-induced environmental damage threatens society through the catastrophic consequences of climate change and pollution. Measurement is critical to coordinate a systems approach to the challenge, from transitioning the energy system, to how we work with the natural world. It helps identify where we must act, and ensure those actions create a sustainable future for humanity.

## Security

The first duty of Government is the security of its citizens. Security is not only preventing physical threats, it's also about securing our way of life, society, and economy. NPL has a huge role to play in security and resilience in our digital world, from confidence in communication infrastructures to trusted timing, ensuring a resilient foundation for citizens to go about their lives with confidence.

## Prosperity

Creating value and impact across the UK through measurement infrastructure that enables enterprises to maximise productivity, accelerate growth, acquire capability and talent for future markets, and improve performance through innovation. NPL will verify and validate through existing or new measurement standards, incremental and radical changes of products, processes, services, and technologies.



CREATING  
**IMPACT**  
FROM **SCIENCE**

For more  
information:  
[www.npl.co.uk](http://www.npl.co.uk)