THE MAGAZINE OF THE INSTITUTE OF MEASUREMENT AND CONTROL INSTMC.ORG

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STEAM MEASUREMENT – KEEPING ENERGY ON TRACK

BUILDING METROLOGY CAPABILITY IN NUCLEAR MANUFACTURING: SELLAFIELD'S NPI, APQP AND NMSA ALIGNMENT

CLAMP-ON ULTRASONIC FLOW MEASUREMENT MODERNISES INDUSTRIAL WATER MANAGEMENT

METROLOGY TECHNICIAN APPRENTICESHIP STANDARD

DECEMBER 2025 ISSUE 38

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PROFESSOR SHEILA SMITH INSTMC PRESIDENT 2022–2025

It has been a privilege to be the President of the Institute and I have enjoyed meeting many of you over the last three years. During my time as President, we have developed a new strategy to take the Institute forward and plan growth to ensure we have a sustainable and supportive future for all our members.

The focus of the strategy is first and foremost to increase the number and diversity of our membership, without whom there would be no InstMC. The strategy includes objectives to raise our profile and increase our influence, develop and implement new income streams, and enhance our interaction with education providers.

I am proud of the achievements we have made in our equality and diversity strategic aims, the result of this is that we now have a women's network (WiMAC) whose mission is to empower women across the industry. Earlier this year we launched an Early Careers Network (ECN), which is setting up a mentorship programme for young engineers. I'd like to encourage members to support these important initiatives.

The measurement and control industry is driven by advancements in technology, increasing demands for precision, and the adoption of digital solutions. SMART sensors and connected devices allow us to make measurements in real time allowing for continuous monitoring, predictive maintenance and remote control of instruments. Breakthroughs in sensor technology are enhancing accuracy and reliability, while smaller sensor devices mean we can monitor physical and chemical analytes in ever more challenging situations.

Process control systems are now equipped with artificial intelligence and machine learning to improve decision-making and operational efficiency, where AI-powered controllers can automatically adjust parameters based on real-time measurements. These systems also identify anomalies which can lead to the prediction of likely failures such as a reduction in downtime and improvements in productivity.

For industry to keep pace, it is crucial that we educate our current workforce in these new technologies as well as recruit and train more apprentices. The vast number of industries that need control

and instrumentation engineers guarantees any young person embarking on a career in this sector an exciting future at the forefront of technology advancements, with the InstMC there to support them on their journey.

On behalf of the Board of Trustees, I would like to thank Dr Billy Milligan, our retiring Honorary Secretary, who has done an outstanding job in fulfilling this demanding role for the last six years. I also thank Richard Leng, Vice President, whose tenure finishes at the end of December. Richard has made an invaluable contribution to the Institute over many years, in particular to the work of PRC. My personal thanks to the staff, who work tirelessly for the Institute, for their support over the last three years.

I would like to wish Professor Andy Augousti, our next President, all the very best for his tenure and I know that the Institute will be in safe hands. Over to you, Andy!

Professor Sheila Smith

CONTENTS

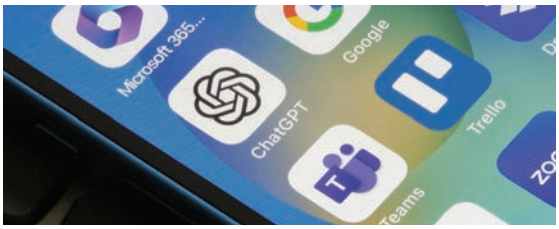
ARTICLES

CLAMP-ON ULTRASONIC FLOW MEASUREMENT MODERNISES INDUSTRIAL WATER MANAGEMENT

Clamp-on ultrasonic flow measurement offers a non-intrusive method for accurately determining fluid flow within a pipe.

18-19

MOBILE PHONE NETWORK BASICS FOR MODERN LIFE ESSENTIALS



A focus on the basics of mobile phone infrastructure technologies due to its vital importance for modern living, including personal safety, health services and security/identity checks.

20-21

METROLOGY TECHNICIAN APPRENTICESHIP STANDARD

The UK faces a persistent shortage of skilled workers in STEM fields. One way to address this is through apprenticeship programmes, which develop the knowledge, skills and behaviours needed to be competent in a role.

22-23

AI WILL BE YOUR OVER-LORD: FASTER, BRIGHTER, BETTER THAN YOU?

The rapid evolution of artificial intelligence is sparking much debate regarding its potential to surpass human capabilities. As AI systems become increasingly sophisticated, more and more questions arise about the potential impact on our daily lives.

25

LOCAL SECTION NEWS

26-30

Central Scotland, North of Scotland, Central North-West and South East recent events covered.

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BY PROFESSOR GILBERTO BRAMBILLA, PROFESSOR OF PHOTONICS, UNIVERSITY OF SOUTHAMPTON

LISTENING WITH PHOTONS

Acoustics is the branch of science that relates to sounds and vibrations, and encompasses applications ranging from music to seismology, noise control, ultrasound imaging and SONAR.

In 1964, Professor Robert Bruce Lindsay [1] introduced the Wheel of Acoustic, a graphic representation that summarised the acoustic sub-fields. It resembles a nested pie chart, where the outer rings contain the various disciplines classically classified within the fields of engineering, life sciences, earth sciences and arts, and at the centre the core themes: fundamental physical acoustics, mechanical radiation in all material media, and phonons.

While it might seem obvious stating that acoustics deals with phoNons, their detection has meant that electronic devices have relied on accurate measurements of a displacement to transform pressure waves into an electrical signal. Yet, precision metrology is carried out using lasers – which have wavelength orders of magnitude smaller than typical acoustic wave lengths – and this has allowed us to exploit the coherent nature of phoTons to perform acoustic measurements. The first acoustic devices exploiting photons relied on a mechanical part, such as a membrane mechanically compliant with the acoustic field, to provide a reflected beam that is made to interfere with a reference beam and dynamically measure the membrane position with accuracy down to nanometres. This measurement of optical interference allows us to record with high-fidelity, acoustic traces over a wide range of frequencies, providing high-performance hydrophones.

Most acoustic sensors perform measurements in a single location (and are often called point sensors), thus provide limited spatial information, generally localised within a few metres of the sensor. Multiple point sensors have been used for monitoring relatively large areas, and their integration has enabled triangulation and more broadly geolocation in environments where the background noise is relatively small. This technique exploits the relatively constant propagation speed of acoustic waves in media to determine the distance of an acoustic source from a detector from the time it takes to go from the former to the latter. Simple geometrical considerations then determine the source position.

The advent of glass optical fibres and the realisation in 1965 by Charles K. Kao and George A. Hockham [2] (then working at the Standard Telephones and Cables (STC) in Harlow) that attenuation in optical fibres could be significantly reduced made fibres a practical medium to access locations farther than 50 miles from the light source. This also resulted in Kao earning the Nobel Prize in Physics in 2009. While the biggest implication of this discovery was the birth of optical communications – which still constitute the internet backbone – it also gave birth to the field of optical fibre sensors, the first conference of which took place in London in 1983.

Optical fibre sensing has revolutionised the sensing field, as it allows for the simultaneous measurement of temperature, strain or vibrations along the length of the fibre and provides millions of synchronous measurements distributed along the fibre. As the price of optical fibres has

continuously decreased and more optical fibres have been laid across the globe to provide access to the internet, optical fibre distributed sensing has provided an extraordinary cost advantage with respect to competitive sensing technologies, as it benefits from easy access to dark fibres already in place and provides a negligible cost per sensing unit (often less than £1). Distributed sensing in optical fibres relies on light scattering from the fibre medium and exploits three phenomena: Brillouin, Raman and Rayleigh scattering. Rayleigh scattering is a naturally occurring phenomenon associated with density fluctuations in glass and is used to describe the sky-blue colour during the day and the red at sunset. It is also the scattering with the strongest signal, usually at least an order of magnitude larger than Brillouin and Raman.

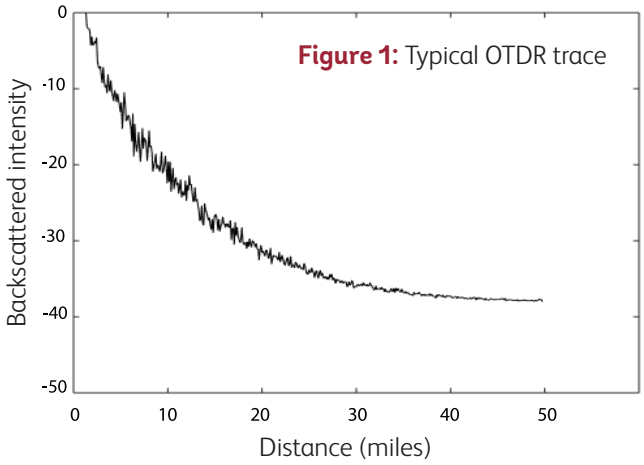


Figure 1: Typical OTDR trace

In the optical time-domain refractometry (OTDR) – the most common form of distributed optical fibre sensing technique – a pulse is sent down the fibre and a small fraction of it is scattered in each fibre section before travelling back to the source. The position is determined by the time light takes to travel back, and a single pulse propagating along the fibre provides information about the fibre until is attenuated to such a level that it is not recognisable from noise. When back reflection from two points positioned at a selected distance (called gauge) is made to interfere and is constantly monitored in time, it provides the dynamic strain – and therefore the vibration spectrum in that location. In other words, a train of light pulses in an optical fibre can provide a simultaneous mapping of acoustic signals along the length of the fibre: this is often called distributed acoustic sensing (DAS).

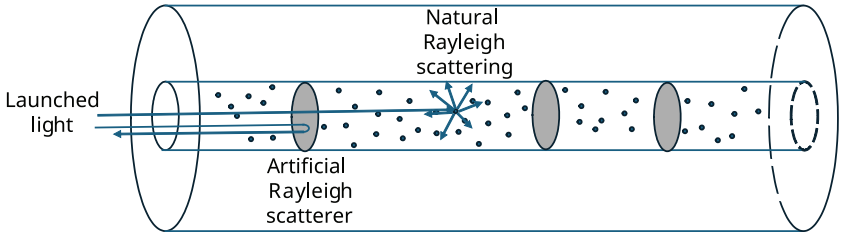
Figure 2: DAS systems are currently used at the bottom of fences to monitor perimeters of sensitive areas like airports

DAS systems have become extremely popular because they enable monitoring of airport perimeters, national borders, and extremely long structures such as pipelines, railways and roads. The data generated by these systems can be enormous, and more recent systems use machine learning and even AI to minimise stored data and to identify the location and typology of the events occurring along up to 200km of fibre [3]. Performance of these systems is often limited by environmental noise, but they can easily recognise human walking in proximity of a buried fibre from cars travelling along a road, working personnel digging holes or even leaks from pipelines. Telecom fibres constitute the internet backbone and there are currently more than one billion kilometres of fibres deployed around the globe. While most of the fibres are used to transmit data, there is a small fraction (called dark fibre) that is not used yet, thus providing an opportunity for DAS systems to turn the internet backbone into a giant nervous system capable of monitoring vibrations across the world.

Underwater telecom links are particularly attractive because the environmental conditions are stable across time and the noise level is intrinsically small, allowing for the easy detection and classification of mammal migration, ship transit, human-generated sounds and seismic/geophysical events [4]. Recording of vibrations across large areas for long periods is of particular interest as it might allow for correlating strong earthquakes with tremors or other forms of seismic events, in practice predicting strong earthquakes within a relatively precise window.

Naturally occurring Rayleigh scattering is intrinsically limited by the materials used to manufacture telecom optical fibres. Because of its random nature, it is often associated with reduced performance, called fading, where the backscattered

Figure 3: Natural Rayleigh centres are less efficient than artificial ones because they scatter light in all directions



interference signal is small and can even disappear in random locations along the fibre. It is possible to generate artificial scattering centres along the fibre – which increases the backscattered signal and the signal stability [5] – with overall signal improvement with respect to the noise level by two orders of magnitudes [6] and reach distances exceeding 300km from the DAS sensing unit [7]. These laser-engineered centres can also improve spatial resolution, pinpointing events occurring on a scale of a few centimetres, or measure sounds and vibrations at high frequency, imperceptible to human hearing. This might result in a paradigm shift in safety and security, where DAS systems allow for in situ structural health monitoring of bridges, tunnels and other large structures, for airport identification/passport replacement using human gait recognition and even for real-time identifying of offshore vessels having engine problems.

Acknowledgements:
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References

[1] Lindsay, J. (1964). Report to the National Science Foundation on the Conference on Education in Acoustics. Acoust. Soc. Am. 36, 2241–2243.

[2] Hecht, J. (1999). City of Light: The Story of Fiber Optics. New York: Oxford University Press. p. 114. ISBN 978-0-19-510818-7.

[3] www. sintela.com

[4] Matthaiou, I. et al. (2025). Classification of images derived from submarine fibre optic sensing: detecting broadband seismic activity from hydroacoustic signals. Geophysical Journal International, 240(1), 483–501.

[5] Lee, T. et al. (2023). Enhanced-backscattering and enhanced-backreflection fibers for Distributed Optical Fiber Sensors. In: IEEE Journal of Lightwave Technology, 41(13), 4051–4064.

[6] Redding, B. (2020). Low-noise distributed acoustic sensing using enhanced backscattering fiber with ultra-low-loss point reflectors, Optics Express, 28(10), 14638–14647.

[7] Brenne, J. K. (2025). DAS with 302km sensing range using remote amplification and engineered fiber, 29th International Conference on Optical Fibre Sensors (OFS29), Porto (Portugal), 25–30 May 2025, paper Tu 3–6.

> Multiple point sensors have been used for monitoring relatively large areas, and their integration has enabled triangulation and more broadly geolocation in environments where the background noise is relatively small.

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STEAM MEASUREMENT — KEEPING ENERGY ON TRACK

BY EUR ING PHILIP A. LAWRENCE, P.E. CENG, FINSTMC, PAL TECHNICAL SERVICES LLC

Steam remains one of the most versatile and widely used energy carriers in industry. From generating electricity to heating process plants, hospitals, and universities, steam drives critical infrastructure. Despite its ubiquity, steam is often treated as "just hot water in a pipe". In reality, accurate measurement is both technically demanding and financially significant. Losses due to poor metering translate directly into wasted fuel, reduced efficiency and higher emissions.

Why Steam Is Difficult To Measure

Steam is unlike most fluids measured in the oil and gas world. It exists in multiple phases – saturated, superheated or wet – with properties that shift rapidly with temperature and pressure. Measuring steam quality (dryness) and energy content requires more than just a flow rate. For practical use, engineers need reliable values for density, enthalpy and specific volume. This makes flow meter selection and installation a specialist exercise, not a routine one.

Differential Pressure (DP) Meters in Steam Service

Although many technologies exist,

most steam flow today is measured by differential pressure (DP) meters or vortex meters. DP meters create a controlled pressure drop across an obstruction, allowing flow to be calculated. The classic orifice plate is still common, particularly in steam injection for enhanced oil recovery where robustness and familiarity are valued. Venturi and cone meters, however, are often preferred because they minimise permanent pressure loss, preserving steam quality while maintaining accuracy.

Each meter type comes with trade-offs. For example, orifice plates can suffer from condensate pooling in horizontal runs, while cone meters handle entrained liquids more effectively. Venturi meters offer very low-pressure loss, making them attractive in power generation and district heating networks.

The Role of Standards and Data

Modern steam measurement depends heavily on accurate property data. The IF-97 steam tables, published by the International Association for the Properties of Water and Steam (IAPWS), underpin today's calculations. They provide a hundred-fold improvement in accuracy over earlier datasets and are as fundamental to steam measurement as AGA-8 equations are to natural gas.

Practical Challenges in the Field

Operators face unique problems when installing steam meters:

- Condensation and pooling – liquid droplets can bias DP measurements.
- Insulation losses – poorly lagged pipes reduce steam quality.
- Instrumentation survival – transmitters must be protected by seal pots or condensing chambers to avoid exposure to live steam temperatures.
- Maintenance issues – weep holes, eccentric plates and segmental orifices often create more uncertainty than they solve.
- A simple principle applies: wherever possible, install the meter on a vertical run, allowing condensate to drain naturally.

Modern Developments

Recent years have seen innovation. Hybrid meters combine DP and vortex technology to deliver real-time readings of both mass flow and steam quality. For plant operators, this means knowing not just how much steam is delivered, but also how effective it is. Such information is vital for refinery heating systems, food sterilisation plants and oilfield injection wells, where quality at the injection point determines recovery efficiency.

Applications Across Industry

- Enhanced oil recovery – steam injection projects in California, Canada and South America depend on reliable metering. Steam quality at the wellhead is often lower than at the generator, making monitoring essential.

Steam States Diagram (Simplified)

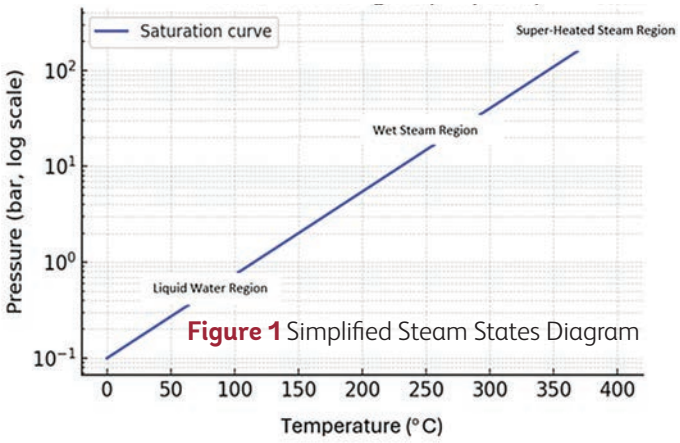

Figure 1 Simplified Steam States Diagram

- Refineries and petrochemicals – accurate steam accounting reduces operating costs and helps track energy balances.
- Power generation – superheated steam drives turbines in nuclear and thermal plants, where efficiency depends on tight control.
- District heating – cities, hospitals and campuses often bill customers based on BTUs delivered. Poor measurement directly affects revenue.
- Food & beverage – breweries, distilleries and canneries use steam for sterilisation and heating, where consistent quality is critical.

Best Practices

1. Choose the right meter type for the application.
2. Install meters vertically wherever possible.
3. Use proper condensate chambers to protect instruments.
4. Insulate piping to maintain steam quality.
5. Verify performance periodically, as steam quality and operating conditions change over time.
6. Confirm the region that the meter is to be operating in (Figure 1).

Looking Ahead

Digital integration is reshaping steam metering. Modern transmitters with built-in diagnostics, IoT connectivity, and predictive algorithms enable operators to detect losses and inefficiencies earlier. Combined with new hybrid designs such as cone-type and vortex meters in a single body, these advances give managers both the assurance of accurate data and the economic benefits of improved efficiency.

Conclusion

Steam may seem simple, but measuring it accurately is anything but. From James Watt's early engines to today's hybrid DP-vortex meters, the principle remains: better measurement means better efficiency. For engineers and accountants alike, the equation is clear:

Accurate Steam Measurement = Sound Fiscal Management + Improved Plant Efficiency.

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IMC/CCSL01-042023

Q&A

Pete Loftus

In the hot seat for this issue is **Pete Loftus**, Director & Principal Consultant at Evalu8ion, who gives us his thoughts on tackling the shortage of UK engineers and the importance of inspiration and creativity in attracting young people to the sector.

What was the root of your interest in Engineering?

My dad was a woodworker, so I developed an early love of the practical and how things worked. My first degree was in applied physics, but then I joined Rolls-Royce for a holiday job and found that engineering was the fun bit of science (to me at least).

What is your vision of Engineering in Britain for the next ten years?

We have had our struggles, but we still have fantastic engineers and scientists innovating like crazy, so the world is our oyster. Organising things does not seem to be a national strength, though, so we have not capitalised on this as we should. A former boss used to say that engineering is a team sport, and that has stuck with me. We need to be good team players, not only with those we like and understand, but with those who bring different talents. Innovation cannot be delivered by engineering alone. It takes a wide range of skills and roles to change the world and, as a profession, we need to be better at partnering with those who bring the extra dimensions.

What should the UK government do to address the shortage of UK engineers?

Well, we either grow them or we import them. Importing them seems politically unpopular at present, so we must focus on the more costly (upfront) approach of growing them. I think government and politicians need to talk more to people with exciting visions of the future and reach out to the engineering institutions for support. If we only hear from people frightened about the future, we will resist it, and the world will advance without us. Engineering will be different, like other white-collar jobs – less about the analysis and more about creativity. That is stimulating, and young people need to be shown that vision.

Measurement engineering, in particular, will be much more embedded with other engineering tasks and bring additional richness to the careers of those who chose to pursue it. I have been working with the review team for the, soon to be released, revision to the metrology trailblazer apprenticeship – with the Institute's National Metrology Skills Alliance, the careers in metrology working group, and through visiting professor engagements to help develop the offering and build engagement. We should not be blinded by the detail, though. No one can stop a generation of motivated young people – they will find the skills, and we will help them. Let's worry less about the detail and focus on the inspiration.

What do you do in your free time to relax?

Well, I am a District Lead Volunteer in scouting – not very relaxing but great fun and loads of inspiration from young people. If you want to learn to manage adults, start with children. They are so much more open and direct.

Given one wish what would that be?

For everyone to value and seek to understand one another. And it would be great if people appreciated the critical impact of measurement and control!

BUILDING METROLOGY CAPABILITY IN NUCLEAR MANUFACTURING: SELLAFIELD'S NPI, APQP AND NMSA ALIGNMENT

MARK OGDEN, MANUFACTURING ENGINEERING MANAGER, SELLAFIELD

As the UK nuclear sector has an ever-increasing demand for repeatable, high-integrity volume manufacturing, typical bespoke engineering to the strategic role of dimensional metrology is being redefined. At Sellafield Ltd, this transformation is being driven by the integration of two powerful frameworks: Advanced Product Quality Planning (APQP) and the InstMC National Metrology Skills Alliance (NMSA) Competency Framework.

Together, for repeatable components, these initiatives are enabling a shift from reactive dimensional inspection to proactive measurement planning, both within Sellafield's Manufactured Products Organisation (MPO) and across its supply chain.

From Aerospace Precision to Nuclear Assurance

My journey into Sellafield began four years ago, when I transitioned from aerospace into Sellafield's Manufactured Products Organisation (MPO) and was tasked with delivering waste-container solutions for long-term nuclear storage.
In aerospace, metrology is a strategic enabler; embedded early, governed rigorously and aligned with functional risk. At Sellafield, however, metrology had historically been treated as a supporting act, with containment and weld integrity dominating milestone reviews.

This legacy approach led to:

- Late-stage dimensional issues discovered post-weld or post-delivery
- Costly rework and concessions
- Limited traceability of critical features
- Supplier quality plans tailored per project, not per product family.

Recognising these inefficiencies, Sellafield mandated a shift towards volume-production best practices. Drawing heavily from the aerospace and automotive sectors, we adopted a gated New Product Introduction (NPI) process, underpinned by APQP and the five core tools: DFMEA, PFMEA, MSA, SPC and PPAP.

Elevating Metrology Through NPI

The NPI framework introduces structured phases, from concept to volume production, each requiring documented evidence of process maturity. Metrology is no longer a post hoc check; it is a design input, a process control, and a strategic lever.

Key metrology actions include:

- Early engagement of metrology SMEs during design feasibility

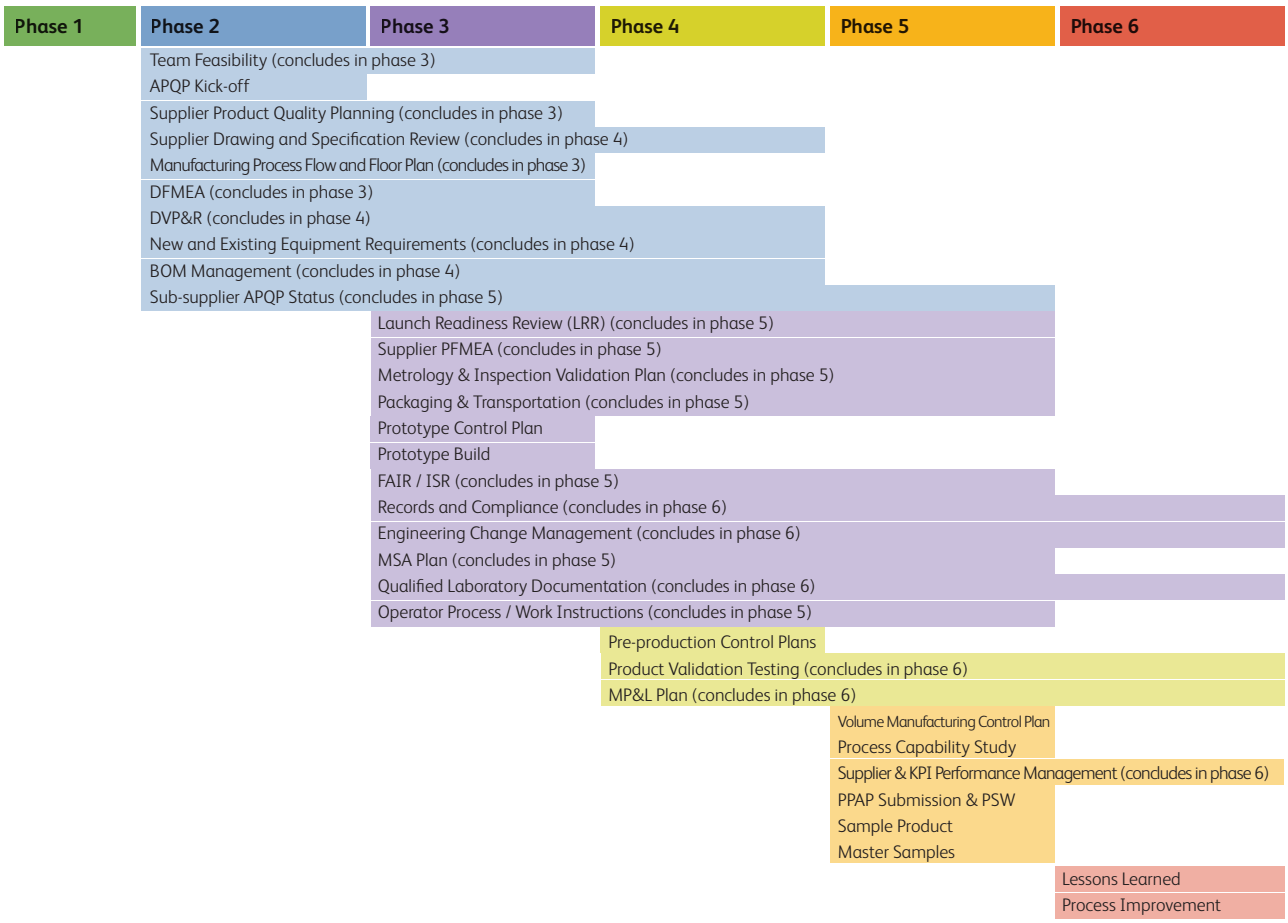
- Feature-based tolerancing linked to functional risk
- Standardisation of equipment (CMMs, laser trackers, non-contact scanners)
- In-process checks embedded into weld fixtures
- Automated data collection and trending for drift detection.

This approach ensures dimensional compliance is validated alongside containment and weld integrity, not after.

Overview of the Sellafield NPI Process

The New Product Introduction (NPI process at Sellafield Ltd represents a strategic shift from reactive, project-specific oversight to a structured, gated methodology designed to deliver repeatable, high-integrity volume-manufactured products. Rooted in Advanced Product Quality Planning (APQP) principles, the NPI framework ensures dimensional metrology, quality assurance and manufacturing readiness are embedded from concept through to full-rate production.

Figure 1 APQP elements and the Sellafield NPI process



Six Phases of the NPI Process

The NPI process is divided into six distinct phases, with defined deliverables and maturity checkpoints:

Phase 1. Customer Requirements and Delivery-Solution Capture Internal IPTs (Integrated Product Teams) define the functional requirements of the product, assess technology options, and propose manufacturing routes. Suppliers are not yet onboarded, although the market is engaged, but this phase sets the foundation for all downstream activities.

Phase 2. Product Concept Suppliers enter the process via tendering. The selected supplier becomes a core IPT member and commits to APQP deliverables. This phase includes feasibility reviews, concept baselining and early metrology planning.

Phase 3. Detailed Product Design Collaborative design reviews ensure manufacturability and dimensional control. Prototypes are built to validate the design intent, and measurement strategies are formalised. This phase culminates in the release of the production-intent design.

Phase 4. Manufacturing Process Development Suppliers install and commission production equipment, develop control plans and begin engineering change management. Metrology systems are validated, and pre-production builds are used to refine process capability.

Phase 5. Manufacturing Process Validation Run@Rate trials are conducted to demonstrate repeatability and throughput. Suppliers submit a Production Part Approval Process (PPAP) evidence pack and a Part Submission Warrant (PSW). This phase confirms readiness for volume production.

Phase 6. Volume Production
Full-rate manufacturing begins. The IPT continues to support and monitor performance, driving continual improvement through lessons learned, KPI tracking and cost-down initiatives.

Each gate requires evolving documented evidence of process maturity, including:

- DFMEA and PFMEA
- Control Plans
- Capability Studies
- Measurement System Analysis (MSA)
- First Article Inspection Reports (FAIR)
- Production Part Approval Process (PPAP).

This structured approach ensures dimensional quality is validated in parallel with containment and weld integrity, not after.

Deploying the NMSA Competency Framework

Figure 2 NMSA Core Standard Team

I was part of the team who developed the NMSA-1 Core Standard and therefore had early access to the information and work to embed this within Sellafield as it was being created.

To support the transformation of metrology into a strategic enabler at Sellafield Ltd, we have adopted the National Metrology Skills Alliance (NMSA Competency Framework, specifically the NMSA-1 Core Standard, across our internal teams and supply chain.

This framework provides a structured, nationally recognised approach to defining and developing metrology skills. It supports both technical excellence and career progression and is designed to be applicable across all metrology disciplines and industrial sectors.

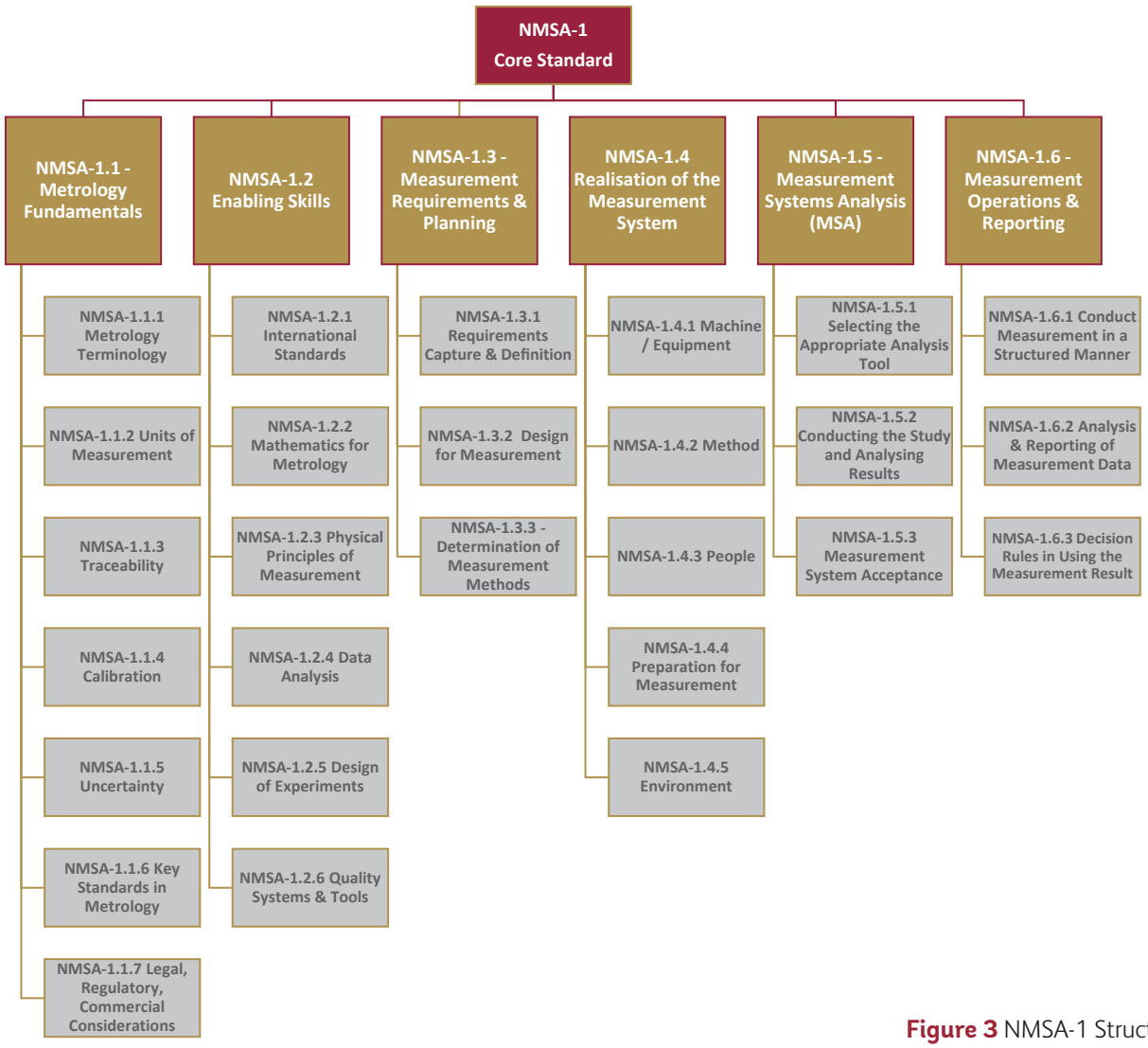


Figure 3 NMSA-1 Structure

The NMSA-1 framework defines four skill levels, each with increasing autonomy, responsibility and complexity:

- Foundation Level
- For non-metrologists (e.g. designers, engineers, managers) who interact with measurement data. This level ensures they interpret results and make informed decisions based on measurement outputs.
- Level 1: Practitioner
- For technicians and inspectors who carry out measurements under supervision, following defined procedures and reporting results.
- Level 2: Senior Technician/Team Leader
- For experienced metrologists who support Level 1 practitioners, contribute to planning and analysis, and make limited decisions within defined boundaries.
- Level 3: Approver/Expert
- For metrology engineers and managers who specify methods, lead complex decision-making, and hold formal accountability for metrology within the organisation.

Application at Sellafield

Internal Deployment

The framework has enabled us to:

- Establish a standardised baseline for metrology competencies across roles.
- Define clear expectations for supporting functions such as design, quality and product management.
- Align training and development with role-specific skill levels, ensuring metrology SMEs, IPT members, and decision-makers have the appropriate level of understanding and capability.
- Support career progression and succession planning within the metrology function.

By mapping roles to NMSA levels, we've clarified who needs what level of metrology awareness and capability, whether they're specifying tolerances, interpreting inspection data or agreeing the funding of new metrology equipment.

Supply Chain Integration

For suppliers, the framework is to be embedded into our tendering and evaluation processes. It will define the minimum competency required to execute work scopes and provide a standardised assessment methodology that will align with industry best practice laid out within the framework.

> Metrology is no longer a post hoc check; it is a design input, a process control, and a strategic lever.

This is reflected in our supplier manuals and APQP deliverables:

- Metrology, Inspection and Validation Plans must detail equipment, calibration regimes and operator training.
- MSA studies are required to validate repeatability and reproducibility.
- Control Plans must link measurement methods to critical features and process risks.
- SQEP matrices must demonstrate personnel competency aligned with NMSA levels.
- Sub-supplier oversight ensures competency is cascaded through all tiers of the supply chain.

By integrating NMSA-1 into our APQP and NPI processes, we ensure measurement capability is not only technically robust but also organisationally consistent and scalable.

Impact and Benefits

Since implementing NPI and the principles laid out within the NMSA Competency Framework, we've seen:

- Reduced lead times through early dimensional validation
- Fewer concessions and rework due to proactive metrology planning
- Improved supplier performance via standardised expectations
- Enhanced traceability of critical features and measurement data
- Personal development of aspiring metrologists with a clear pathway for competency.

Additionally, the gated NPI process fosters shared ownership between engineering, quality, metrology and suppliers, collaboratively driving proactive problem-solving and continuous improvement.

Lessons Learned

Our journey has yielded several insights:

- Aligning metrology strategy with functional requirements prevents over-inspection.
- Standardising tools and methods reduces variability across facilities.
- Clear gate criteria enforces discipline without stifling innovation.
- Training in core tools cultivates a quality-first mindset.

Looking Ahead

We're now exploring:

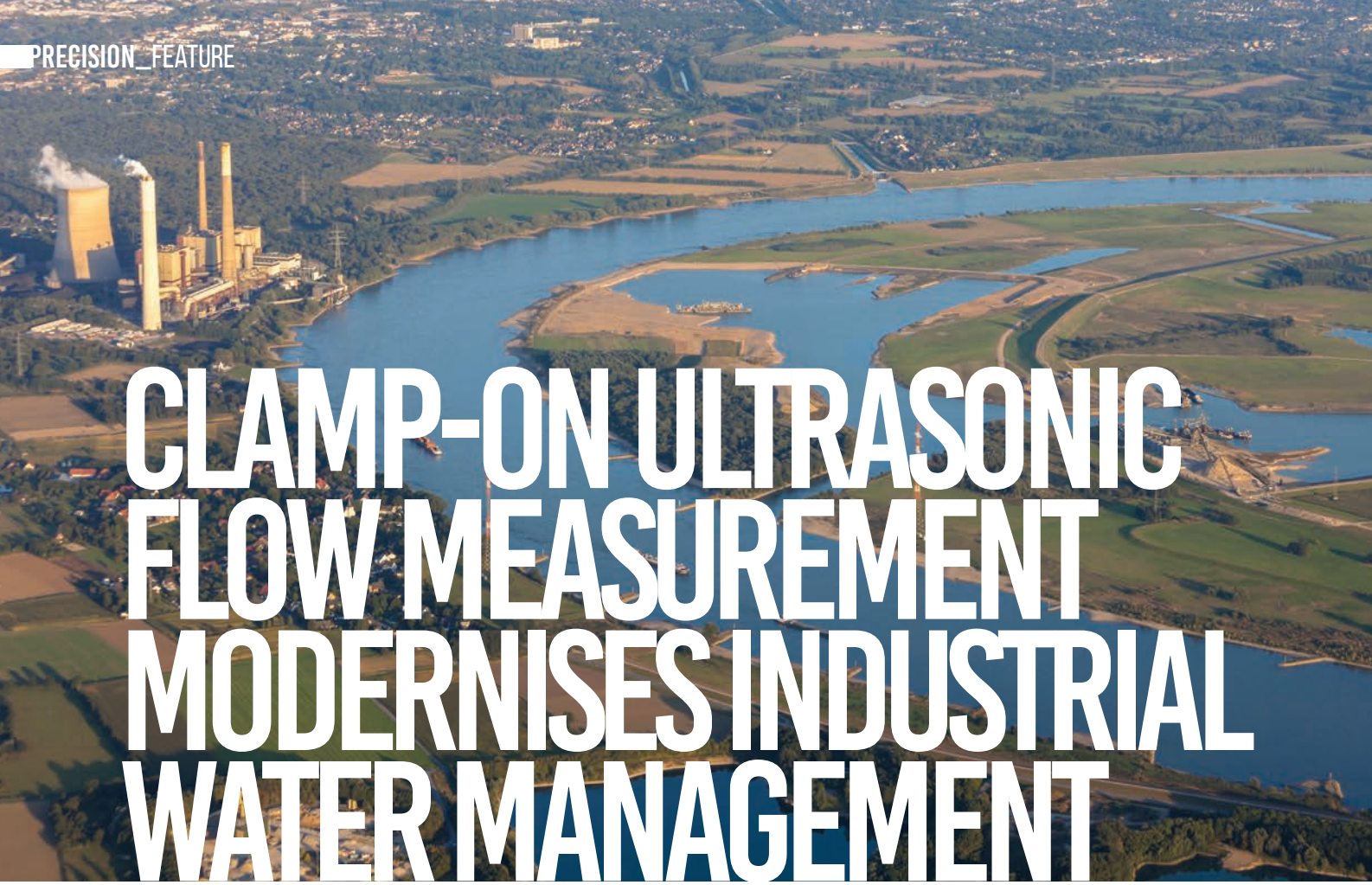
- Digital twins for virtual measurement validation
- Real-time in-process metrology to accelerate decision-making
- Competency dashboards to track NMSA alignment across teams and suppliers.

Our experience shows that even in safety-critical industries, combining rigorous nuclear standards with proven manufacturing best practices unlocks substantial value. By centralising metrology and embedding competency frameworks, we're not just improving quality, we're building a resilient, capable supply chain for the future of nuclear manufacturing.

We plan to further embed NMSA-1 into:

- Competency dashboards for internal and supplier teams
- Training programme and accreditation aligned with NMSA-3 (qualification processes)
- Sector-specific standards (NMSA-2) tailored to nuclear manufacturing and dimensional metrology.

The NMSA Framework is more than a skills assessment. It is a strategic tool for building a resilient, capable metrology ecosystem across the nuclear supply chain.



CLAMP-ON ULTRASONIC FLOW MEASUREMENT MODERNISES INDUSTRIAL WATER MANAGEMENT

Clamp-on ultrasonic flow measurement offers a non-intrusive method for accurately determining fluid flow within a pipe. By placing transducers on the outside of the pipe, ultrasonic signals are transmitted through the pipe wall and fluid. The difference in signal transit times provides a precise calculation of flow velocity. This technique eliminates the need for pipeline modifications, making it ideal for applications where operational continuity and low maintenance are critical.

Industrial Water Use – A Critical Resource

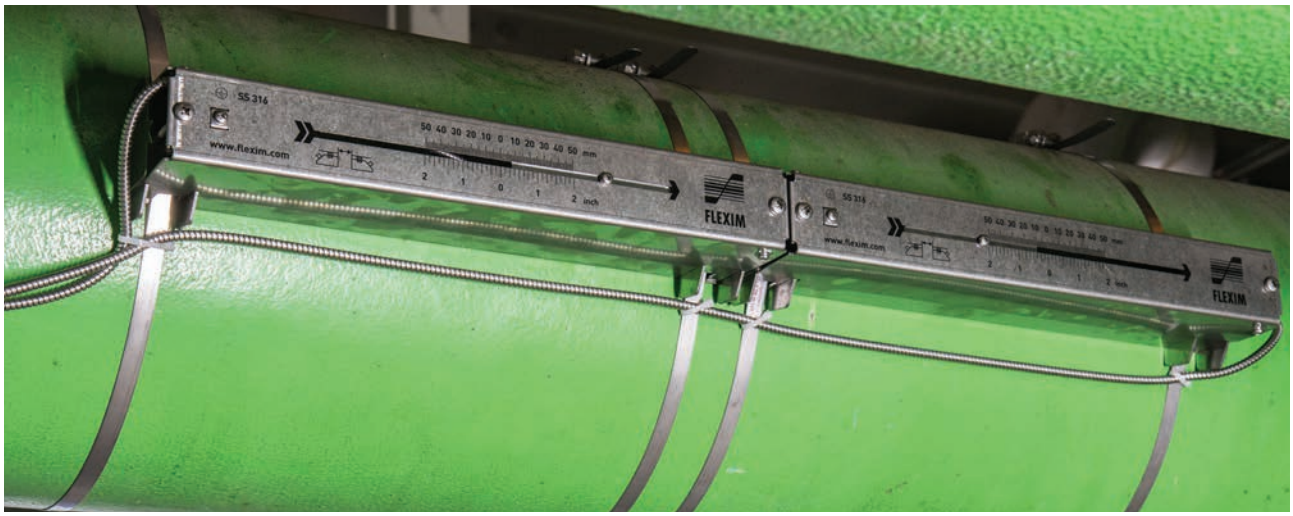
At one of the major industrial sites along the Lower Rhine, water is an indispensable raw material. It supports a wide range of applications – from chemical processing and energy generation to cooling and cleaning. The operator centrally supplies different grades of water, including drinking, demineralised, and large volumes of process and circulation water.

Annually, the site moves approximately 760 million cubic metres of water through a vast pipe network. The majority serves as process water for through-flow cooling and circulation water for temperature regulation. This scale of usage is energy-intensive, with hundreds of pumps and drives consuming around 240,000 megawatt hours of electricity each year.

Optimising water use isn't just an environmental goal – it's an economic and energy imperative. And optimisation starts with accurate measurement.

The Measurement Challenge

Historically, a measuring orifice was used to monitor raw water flow into a storage tank, providing a reliable means of capturing key data. As operational demands evolved, and the focus shifted towards energy efficiency and streamlined maintenance, engineers began exploring alternative technologies. The goal was to implement a modern solution that could be integrated seamlessly – without



requiring service interruptions or modifications to existing infrastructure.

Clamp-On Ultrasonic Technology in Action

Thanks to the previous successful applications at the same site, engineers opted to retrofit an existing DN300 steel pipeline with a stationary clamp-on ultrasonic flow meter. This choice was based on a proven track record of performance in demanding industrial conditions.

Clamp-on systems offer key advantages, such as installation without pipe modifications, no risk of contamination, zero pressure loss, and minimal maintenance. These benefits were particularly important given the volume and criticality of the water being measured.

Years earlier, a successful on-site demonstration – conducted under challenging conditions, including poor pipe surfaces and internal buildup – showcased the effectiveness of clamp-on ultrasonic technology. Since then, numerous clamp-on meters have been installed throughout the water management system, reliably measuring a wide range of media, including raw water, steam, condensate, and even gases such as ammonia.

Long-Term Gains in Efficiency and Reliability

The retrofit was completed without any operational downtime, and the new setup introduced no energy loss or mechanical wear. For a facility managing such massive water volumes and energy loads, these small improvements translate into significant long-term gains.

Clamp-on ultrasonic flow measurement has evolved from a niche solution into a robust, industry-proven technology. In large-scale water systems where reliability, accuracy and efficiency are essential, non-intrusive flow monitoring is now a cornerstone of sustainable infrastructure.

To find out more about the capabilities of clamp-on ultrasonic flow measurement in the chemical industry, or to discuss short- or long-term portable flow meter rental options, contact Simon Millington – Flexim I Emerson GB I flexim-uk@emerson.com I +44 (0)1606 781 420

Flexim Instruments UK is an InstMC Companion Company Scheme member.

BY PETER NORMAN, MINSTMC, MIET

MOBILE PHONE NETWORK BASICS FOR MODERN LIFE ESSENTIALS

A focus on the basics of mobile phone infrastructure technologies due to its vital importance for modern living, including personal safety, health services and security/identity checks.

This article will cover domestic mobile phone infrastructure, which will inevitably have some relevance to offices. Some commercial buildings will have compact signal-boosting systems installed externally or internally to improve business group performance.

Owning a mobile phone in the UK is essential with the impending removal of analogue, copper landlines (public switch telephone network, or PSTN) to centralised telephone exchanges for voice over internet protocol (VoIP). Whereas telephone exchanges have secure power supplies for 50V.DC line voltage, VoIP will be vulnerable to mains power outages and data centre faults.

Purchasing a new mobile phone handset (only) can be a good money-saving option in the long run. Surfing online signal strength/coverage checking tools will help you decide which mobile network operator (MNO) to sign up with. I soon determined that it was only worth buying a 4G handset since 5G is not consistently available everywhere – and is more relevant to heavier interactive data requirements and usage. Technical considerations for best handset performance then seem more important than finding the cheapest handset or SIM-only deal.

The table below indicates the wavebands and representative frequencies that a modern mobile handset should be able to handle to cover the major UK MNO exclusive licences within these bands. Smaller service operators only use the backends of the networks operated by EE, O2 (Telefónica), Vodafone (Vf) and Three. Vodafone and Three merged to become VodafoneThree back in May 2025. NR band n78 is the C-band ranging from 3300 to 3800 MHz.

The handset manufacturer's specifications should reveal the main connectivity and network frequencies covered by their internal multiple antennas integrated into the electronics and which also incorporate elements for WiFi, Bluetooth and GPS.

Table #1: Mobile Cellular Radio Frequencies for Europe and Asia – UK Network Providers Only

LTE Band	GSM MHz	G	Network
20	800	4	O2/EE/3
8	900	2 & 4	O2/Vf
32	1500	4	3
3	1800	4	EE/O2/3
1	2100	4	O2/EE/Vf/3
40	2300	4	O2
7	2600	4	EE/Vf

NR Band	MHz	G	Network
n78	3500	5	O2/EE/Vf

LTE = long-term evolution

'Core' Band #s **1, 3, 7, 20** = bands most used in the UK

GSM = Global System for Mobile Communications

NR = new radio

Note: Other GSM frequencies are unique to the USA, such as 850 MHz and 1900 MHz. Also, I've omitted any references to 3G services as the MNOs have either already ceased or are about to phase out 3G to improve 4G and 5G. That said, the final deadline for ceasing 2G/3G is not until 2033.

GSM

The European Conference of Postal and Telecommunications Administrations (CEPT) initiated a project in 1982 to develop a pan-European mobile communications standard to improve the technology across Europe. In 1987, the GSM Association was formed to oversee the project and ensure a cohesive approach.

The first set of GSM specifications was published in 1989, with a focus on key functionalities such as frequency allocation, channel structure and basic services.

The GSM technology progressed in the early 1990s, with Finland launching the first commercial GSM network in 1991. The following years witnessed rapid expansion as several European countries began rolling out their networks.

SMS (short message service) was launched in 1992 and became a popular communication method.

Data services, with the introduction

of GPRS (General Packet Radio Service), enabled GSM networks to handle packet-switched data, which paved the way for mobile internet access.

International roaming initiatives allowed users to access GSM services outside their home networks, which further boosted its adoption.

GSM had become a global standard by the late 1990s, with networks established in Europe, Asia, Africa and the Americas. Its flexible technology meant it thrived in market conditions and solidified its position in the telecommunications sector.

The late 2000s marked the rise of more advanced technologies such as LTE (long-term evolution) and 4G networks. GSM's modularity and backward compatibility, however, allowed operators to integrate these new technologies while maintaining GSM services.

New Radio Technology for 5G

The new radio (NR) technology provides a 5G migration path to all 4G LTE cellular networks worldwide, irrespective of the earlier generation technologies they use. 5G enables higher download speeds; however, average speeds are considerably lower. Unlike earlier cellular technologies, which only focused on mobile phones, tablets and low-bandwidth IoT devices, 5G NR technology has a very flexible approach to addressing use cases within the consumer and enterprise segments. The focus of 5G is on the varying levels of data rates and latencies that the network can support to enable a wide range of industry use cases.

5G NR employs a flexible frequency spectrum, advanced MIMO (multiple input, multiple output) antenna technology, network slicing for network virtualisation, dual connectivity for co-existence with 4G LTE, and reduced latency through edge computing to bring content closer to users.

Mobile Phone Infrastructure in the UK

Two UK companies provide mobile phone infrastructure equipment for the Big Four MNOs – soon to be only the Big Three. Mobile Broadband Network Ltd typically serve both EE and Three. Cornerstone Telecommunications Infrastructure Ltd typically serve O2 and Vodafone. Therefore, it's not unusual to find two MNOs sharing a common support structure for their separate antennas.

Recognising Mobile Antenna Masts in Local Areas


Figure 1

A key feature of a monopole (see Fig. 1) is its triple array of 'spacial diversity' antennas at the top, spaced at 120o angles to cover 360o.

The low GSM frequencies use longer antennas for their longer wavelengths used by 4G and below. The grey casings, however, contain multiple antennas in two internal columns to provide greater interoperability as well as different frequencies for 2G to 4G services. The smaller antenna units will contain MIMOs for high frequencies of shorter wavelength required for 5G. Monopoles may also have their antenna arrays completely shrouded by cylindrical, grey-painted covers. A future trend may be to place radio equipment just beneath the antenna groups for improved efficiency. Several global manufacturers make antennas, but the general public would not be able to identify these from a distance.

It should now be noted that the lower frequencies with longer wavelengths can travel greater distances than the higher frequencies with shorter wavelengths. However, lower frequencies lose energy faster when there are multiple users in urban areas, whereas higher frequencies have more energy to cope with higher user demands. Lower frequencies are better at penetrating walls than higher frequencies.

The dark green cabinets at ground level require 230V.AC to power their internal electronic radio modules and have a label identifying the MNO(s).

Generally, such big pole installations are expensive, which is where shorter masts on the top of commercial or residential buildings – higher than their surroundings – are preferred and able to support multiple MNO antennas as well as other broadcasting antennas, and even line-of-site, circular dishes, such as those in Fig. 2, on commercial buildings.

Other antenna support structures are stand-alone steel lattice towers, spare space on a large pylon, or repurposed old communication towers. The important factor, then, is strength against wind load stress in exposed rural areas. The structures in the photos all feature lightning rods.

Smart Energy Meters' future functionality

The master plan in the UK is for the communications hub modules on the top of electricity smart meters to be substituted with 4G units before the current 2G/3G networks are disinvested. Vodafone signed a 15-year contract with the Data Communications Company (DCC) in 2023 to take on the task, and 4G units are currently being tested before smart meters are converted to operate over 4G.

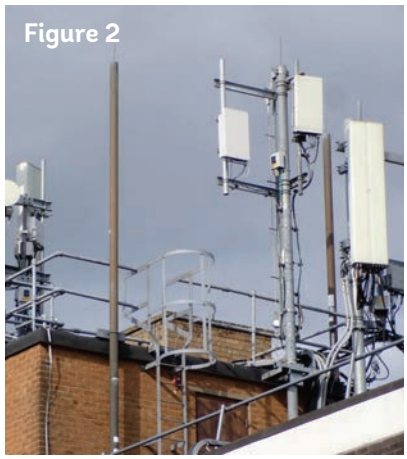


Figure 2

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METROLOGY TECHNICIAN APPRENTICESHIP STANDARD: RECENTLY REVISED AND AVAILABLE TO SUPPORT METROLOGY SKILLS DEVELOPMENT

The UK faces a persistent shortage of skilled workers in STEM fields. One way to address this is through apprenticeship programmes, which develop the knowledge, skills and behaviours needed to be competent in a role.

Apprenticeship programmes help create accessible routes into STEM careers and combine practical, on-the-job experience with structured study and training. Apprenticeships can help close skills gaps, boost productivity, diversify the workforce and foster long-term employee loyalty, providing employers with a strategic way to develop a skilled, motivated workforce tailored to their needs.

At the heart of scientific, engineering and technological innovation lies metrology – the science of measurement. The metrology technician apprenticeship standard was developed by the Metrology Trailblazer group – a group of employers, professional bodies, trade associations and other key stakeholders. The standard was first introduced in 2017 to develop the metrology skills that are fundamental to a broad spectrum of sectors and industries, including advanced manufacturing, aerospace, automotive, energy, environment and healthcare, as well as to inspire the next generation of metrology technicians and create a launchpad for a career in metrology.

The metrology technician apprenticeship standard has recently been reviewed by the Trailblazer group to ensure it continues to meet the needs of employers in ever-increasing digital, data and technologically advanced environments. In November 2025, the updated standard was approved for delivery by Skills England, who are responsible for co-creating and refining a set of education and training products – which include apprenticeships – with employers and other partners.

The standard continues to define the knowledge, skills and behaviours required of competent metrology technicians and supports a wide range of job roles across engineering and science workforces. Typically delivered over three years, it is a Level 3 advanced apprenticeship equivalent to A Levels.

The metrology technician apprenticeship standard meets the requirements for Registered Engineering Technician (EngTech) and Registered Science Technician (RSciTech) and aligns with Level 1 of the National Metrology Skills Alliance (NMSA) Metrology Skills Framework, a skills framework for metrologists and other individuals working in metrology fields.

If you would like to find out more about the metrology technician apprenticeship standard, please visit the Skills England website: https://skillsengland.education.gov.uk/apprenticeships/st0282-v1-1

If you are interested in searching for an apprenticeship training provider, please follow this link: https://www.findatrainingprovider.co.uk/. To find out more about Skills England, visit https://www.gov.uk/government/organisations/skills-england

Claire Hutchinson, Chair – Metrology Trailblazer Group and Training Unit Leader at the National Physical Laboratory (NPL)

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PRECISION MAGAZINE

AI WILL BE YOUR OVERLORD: FASTER, BRIGHTER, BETTER THAN YOU?

The rapid evolution of artificial intelligence is sparking much debate regarding its potential to surpass human capabilities. As AI systems become increasingly sophisticated, more and more questions arise about the potential impact on our daily lives. Jobs are becoming more automated, and we continue to rely further on our devices to run our lives.

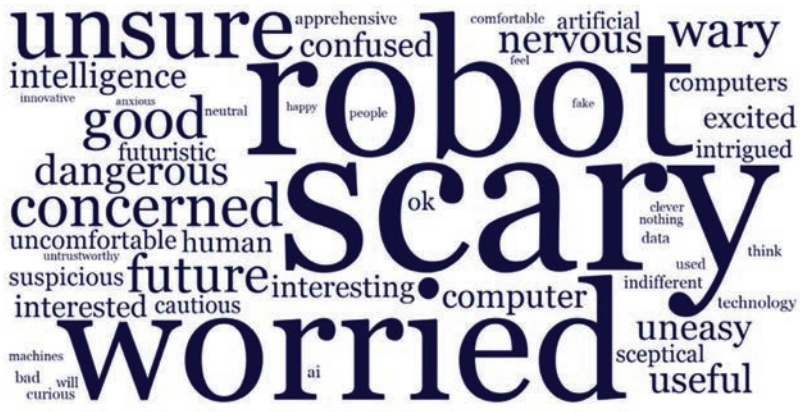
Does this mean our time is up?

This was the opening question posed by Professor Matt Jones at a recent Gresham College event: '*AI Will Be Your Overlord: Faster, Brighter, Better Than You?*'

The '100 Year Study on Artificial Intelligence', published every five years by Stanford University, investigates how the effects of artificial intelligence will ripple through every aspect of how we live, work and play. In the latest version, released in 2021, experts predict that by 2050:

- A robot team will beat the current FIFA world champions
- AI will be smarter, faster and more intelligent than all the scientists and academics in the world.

As humans, we have taken our status as 'top dogs' for granted and now, perhaps for the first time, that position feels under threat. The UK government has produced a tracker survey report recording 'Public attitudes to data and AI' (https://www.gov.uk/government/publications/public-attitudes-to-data-and-ai-tracker-survey-wave-4/public-attitudes-to-data-and-ai-tracker-survey-wave-4-report), and within that report created a word cloud of public sentiment towards AI. It may come as no surprise that the dominant words are 'scary', 'unsure' and 'worried'.



Who can we blame for feeling anxious? We trust what machines and devices tell us. We give them authority and credibility – and there the danger lurks! Whether it's Alexa giving us facts, figures and the latest weather report or Eliza, a psychotherapist chatbot created in 1966 to test a machine's ability to match the intelligence of a human being, we have willingly invited artificial intelligence into our lives.

So, what does the future hold? Will AI lead to the extinction of humanity? According to Professor Matt Jones, there are four steps to what could be our downfall:

1. Foundation Model: AI model trained on vast amounts of broad data which can provide the building blocks for AI applications such as chatbots, code writers and image generators.
2. Agentic AI: small pieces of software that can autonomously create things for you, e.g. travel assistants and proactive customer service bots making decisions, taking steps and achieving specific goals.
3. Artificial General Intelligence: can do everything a human can but doesn't ever stop or sleep!
4. Artificial Superintelligence: a hypothetical system that exceeds human cognitive abilities in virtually every domain, including creativity, problem-solving and emotional intelligence.

The source of our fear is best pinpointed by AI pioneer and author Margaret Boden, who said creativity is considered the pinnacle of human intelligence and that when these systems are able to replicate that creativity, that is what should concern us most.

Professor Matt Jones is a computer scientist at Swansea University, a Fellow of the British Computer Society and the current IT Livery Company Professor of Information Technology.

To view the full lecture on YouTube, visit https://www.youtube.com/live yZfxd66JI0s?si=94UpoVsgBb6c44EA

LOCAL SECTION NEWS

CENTRAL SCOTLAND

On 25 September we held a Lunch & Learn session at Forth Valley College, Falkirk with Dräger showcasing their Gas Detection Car. This was a great opportunity for visitors to get hands-on experience with safety instrumentation and to explore technologies critical to measurement and control applications, including gas detection (flammable and toxic gases), flame detection, emissions monitoring, wireless gas detection (ATEX and non-ATEX) and integrated safety panels.

On 22 October, Jon Hichens of insightEX gave a presentation on the ATEX installation standard IEC 60079-14:2024 with a focus on the changes, specifically to cable gland selection.

Steven Biggs
Chair, Central Scotland

NORTH OF SCOTLAND

Thanks to Environmental Resources Management (ERM) for hosting our Bite Nite Technical event, particularly Andrew Derbyshire for his presentation and Gillian Ewan for helping organise the event.

Our Bite Nite followed an ERM Safety Roundtable event during the day which focused on Functional Safety, with panel sessions on FS Management and Competency Management for Safety Systems.

We were honoured to have Chris Lemons speak at our Annual Awards dinner. This is our major fundraising event of the year, and we were once again able to donate to Maggie's in support of their excellent work thanks to the raffle. Thanks to every company which took a table and provided a raffle prize.

This event really is the networking jewel in the crown of the C&I community in the North of Scotland and we were pleased to see so many people come along. Here are a few photos from the evening.

Sandy Leitch
Chair, North of Scotland

LOCAL SECTION NEWS

CENTRAL NORTH-WEST

Changing of the guard

2025 has been an interesting year for the Central North-West committee. We have launched new initiatives such as podcasts, and seen long-standing chair Dave Green step down to pursue the role of Vice-President of the InstMC Council. Dave's commitment and dedication to the committee over the last seven years have been commendable, and, as the new chair of the CNW committee, I imagine I will be calling on him for many years to come.

Annual Awards Night

This year's Annual Awards Night was, once again, a roaring success, with a fantastic turnout of over 130 attendees. It was an opportunity to celebrate the rising stars of the engineering world by hosting several awards.

Central North West Committee

Early Career Engineer Award – Sponsored by ITI Group

This year's winner, Azizeh Lotfivand (nZero Group), beat the strong competition to deliver a fantastic presentation on her work on the software development for biomethane network entry facilities across the UK.

Azizeh demonstrated a strong grasp of the process and functionality of these complex systems and showcased how she had learned from scratch by working closely with the commissioning teams.


Azizeh Lotfivand

Apprentice of the Year Award – Sponsored by Capula

Harvey O'Rourke took this award after being nominated by his company, Endress+Hauser. Harvey's application surrounding his overall attitude and aptitude as an apprentice was nothing short of incredible. It shows that the future of engineering is in safe hands if the calibre of Harvey and the other applications is anything to go by.

Harvey received glowing references with regards to Excellence, Sustainability and Customer Feedback.


Harvey O'Rourke

University Awards

The evening also hosted the winners of the annual University of Manchester engineering award, sponsored by Sella Controls, and the Liverpool John Moores University engineering award, sponsored by ITI Group.

Many congratulations to the deserving winners. If you wish to apply for either of these awards in 2026, please don't hesitate to email cnw.awards@gmail.com.

If you are interested in joining us for the 2026 Annual Awards Night, please contact me at cnw_chair@members-instmc.org so I can pass your details to our Social Secretary.

Podcast

Our engineering podcast continues to grow in popularity, and we released the second instalment at our Annual Awards Night. This latest episode is a deep dive into the life of Ron Bell OBE, an instrumental figure in the development of functional safety and the IEC 61508 standards.

We have a broad range of topics to cover in the upcoming episodes, including raising awareness of ADHD in engineering.

Find these podcasts on Spotify by searching **InstMC Central NorthWest Podcasts.**

The Future

2025 was a great year for the CNW local section. Our committee is stronger and more committed than ever, and we are now driving new ideas on how to increase engagement and, ultimately, usefulness, for our members.

I for one am really looking forward to what 2026 will bring.

Jon Alexander
Chair, Central North-West Local Section
cnw_chair@members-instmc.org

LOCAL SECTION NEWS

SOUTH-EAST

Our autumn event season kicked off in September with a webinar on 'Global Economics for the Energy Sector' by Neil Golding of the Energy Industries Council (EIC), who gave an extensive overview of the whole world situation with respect to energy projects in planning, design and construction.

Our October presentation was 'Understanding Control Valves' by Prab Kumar from Samson Controls Ltd, who provided a well worthwhile study of a 'back to basics' subject. Prab managed to cover almost every aspect of control valve design and application, including the types and strengths of valves and their role in a control loop, plus key data and considerations for making the right choice with technical valve selection.

On 24 September we held a successful Instrumentation exhibition on KBR premises with 18 vendors. We have added at least one more Companion Company and have identified six potential members from that event.

We have put together what we believe is an interesting and varied set of educational and technical webinars covering a wide range of subjects. Here is a summary of our upcoming events for the next six months:

9 December – **Predictive Failure Analytics, Bray UK**

13 January – **Self-Verifying Ultrasonic Flowmeters, Sensia/Rockwell**

10 February – **Digitalisation of Safety Systems, Sella Controls**

10 March – **Heads in the Cloud: Life Sciences, Emerson**

14 April – **Integrating AI into the Engineering Process, ICSS Ltd**

12 May – **5G in the Process Industries, Digital Catapult**

Full details will be available nearer the time from the InstMC website Events Calendar: https://www.instmc.org/events

Malcolm George
Chair, South-East Local Section
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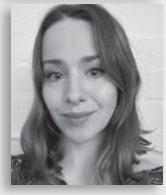

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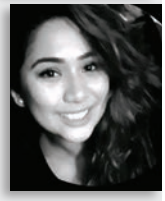

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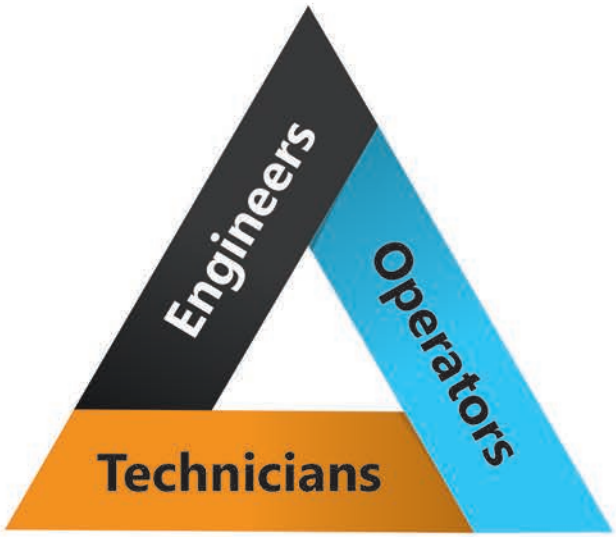
Do It Right
Do it Once

Every role matters in the Functional Safety lifecycle



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