

An Engineering Partnership

The Royal Academy of Engineering's National Engineering Policy Centre



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Nick is Director of Policy at the Royal Academy of Engineering. He leads the Academy's policy work spanning all areas of engineering from Net Zero to data through to construction and infrastructure. He directs the Academy's leadership of the National Engineering Policy Centre and also leads the Academy's International Partnerships. Nick joined the Academy in January 2018 from the Department of Business, Energy and Industrial Strategy Skills, and has previously worked for Cabinet Office, Defra, the National Farmers' Union, and the British Red Cross.

INTRODUCTION by Stephen Barber, PWI CEO

PWI members often ask me how the Institution can use its collective expertise to influence government and other policy making bodies, so that their decisions and actions, particularly in the field of transportation, are informed by solid engineering advice. The PWI isn't the only one of the UK's 40 professional engineering institutions (PEIs) to have pondered that question and, as the technological world has become ever more complex, government has found itself facing a range of sources offering uncoordinated and potentially conflicting information and advice: a situation not conducive to effective decision making!

Under the wing of the Royal Academy of Engineering, the UK PEIs have come together to help provide government and other policy makers with a clear source of coordinated policy advice and support across the broad field of engineering. Established in 2018, the National Engineering Policy Centre now speaks with a single voice on engineering policy matters, representing and calling on expertise and advice from all UK PEIs. It is now through the NEPC that the PWI seeks to exercise influence and I've invited Dr Nick Starkey, the NEPC's Policy Director to tell PWI members a bit more about the Centre's work.

As we move forward and are inevitably faced with more policy dilemmas, I trust expert PWI members will support Nick's team and other PEI experts to ensure UK policy decisions are based on the best available engineering advice.

AN ENGINEERING PARTNERSHIP by Nick Starkey

Stephen Barber noted to me in a recent email that the current strategic policy agenda is bulging at the seams. With the adjustment after Brexit, the physical and economic impacts of Covid-19 and the potential for future pandemics, COP26*, decarbonisation and climate adaption and more, he is certainly right!

What is sometimes underappreciated is the role that engineers are playing not only tackling those issues on the ground, but also advising policy makers as they grapple with the governance challenges these issues bring. Whilst we have heard much about 'following the science' during Covid-19, the importance of government receiving good engineering advice has not always been fully appreciated in a Whitehall civil service environment where economists and statisticians have historically been more likely to have the Permanent Secretary's ear. In part, the engineering profession's impressive range of specialisms has been both a strength and a weakness here. The expertise held within an institution such as the PWI is deeply valuable, but a profession of 40 such institutions is hard to navigate, and time-poor officials often struggle to engage. That is why we established the National Engineering Policy Centre. Led by the Royal Academy of Engineering, it is a partnership between the Academy and the 40 professional engineering institutions, plus Engineering UK and the Engineering Council. The Centre connects policy makers with critical engineering expertise to inform and respond to policy issues of national importance.

Our recent spending review document was signed by every one of those 43 organisations, the PWI among them, and demand from senior levels of government for our advice has been increasing exponentially since the Centre was established.

Working together through the Centre also enables us to give better advice. By working across and beyond different engineering specialisms, we have been able to bring a cross-disciplinary approach to our study of the safety and ethics of autonomous systems and I've provided an extract (Figure 1) from that work to illustrate the Centre's output. Working together we can take a systems approach to complex issues such as decarbonisation; our programme Net Zero: A Systems Approach to the Climate Challenge has seen us engage with Cabinet Office, No.10 Downing Street and multiple government departments as we build up to COP26.

How do the modes compare?

	Road	Air	Sea	Rail
Presence of automation	Modern cars already come with different degrees of automated functions from simple cruise control to more advanced lane changing and self-parking capabilities.	A significant amount of air travel is already highly automated. The pilot is typically responsible for supervising the automation and take-off and landing procedures.	Maritime platforms are traditionally viewed as 'hands-on' with regards to engineering intervention. In relation to safety and crewing, governance is largely done via international regulations that stipulate who has responsibility and how often inspections, for example, must take place.	The Docklands Light Railway has operated without a physical driver since 1987. Several London Underground services are partially automated; starting and stopping controlled by software and operators required to identify when it is safe to close the doors.
Drivers of progress	Potential safety improvements and a supportive policy environment have resulted in a sense of inevitability about the extent of automation.	Autonomous flight requires adjustments to many parts of the system grouped together as urban air mobility (UAM).	The development of autonomous surface ships has been driven by reducing running costs and taking people out of harm's way. Removing people from the vessel.	Rail automation has focused on reducing operating costs, increased service reliability and throughput to allow for faster services.

Figure 1: Extract from NEPC document graphic: Automation - How do the modes compare?

Transport is a recurrent theme in our work. We have worked with the Department for Transport to map and better understand the potential uses of hydrogen across the future transport system and have offered advice to government during the pandemic on issues from restarting transport after pandemic lockdowns to engineering controls to reduce virus transmission on transport. The Policy Centre is reliant upon the expertise in the engineering community and forms a vehicle through which specialist engineering advice from institutions such as the PWI can inform decisions at the highest level. Gathering policy advice that has weight and is based on evidence and expert judgment takes resource and organisation, and Stephen's article in the January 2021 edition of the Journal set out some of the things the Institution is doing internally to bring your expertise to the issue of climate change. We are certainly far more influential together than apart and I am always grateful for the Institution's continued engagement in the Policy Centre and its work.

*COP26 is the 2021 United Nations Climate Change Conference scheduled to be held in Glasgow between 1 and 12 November.

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