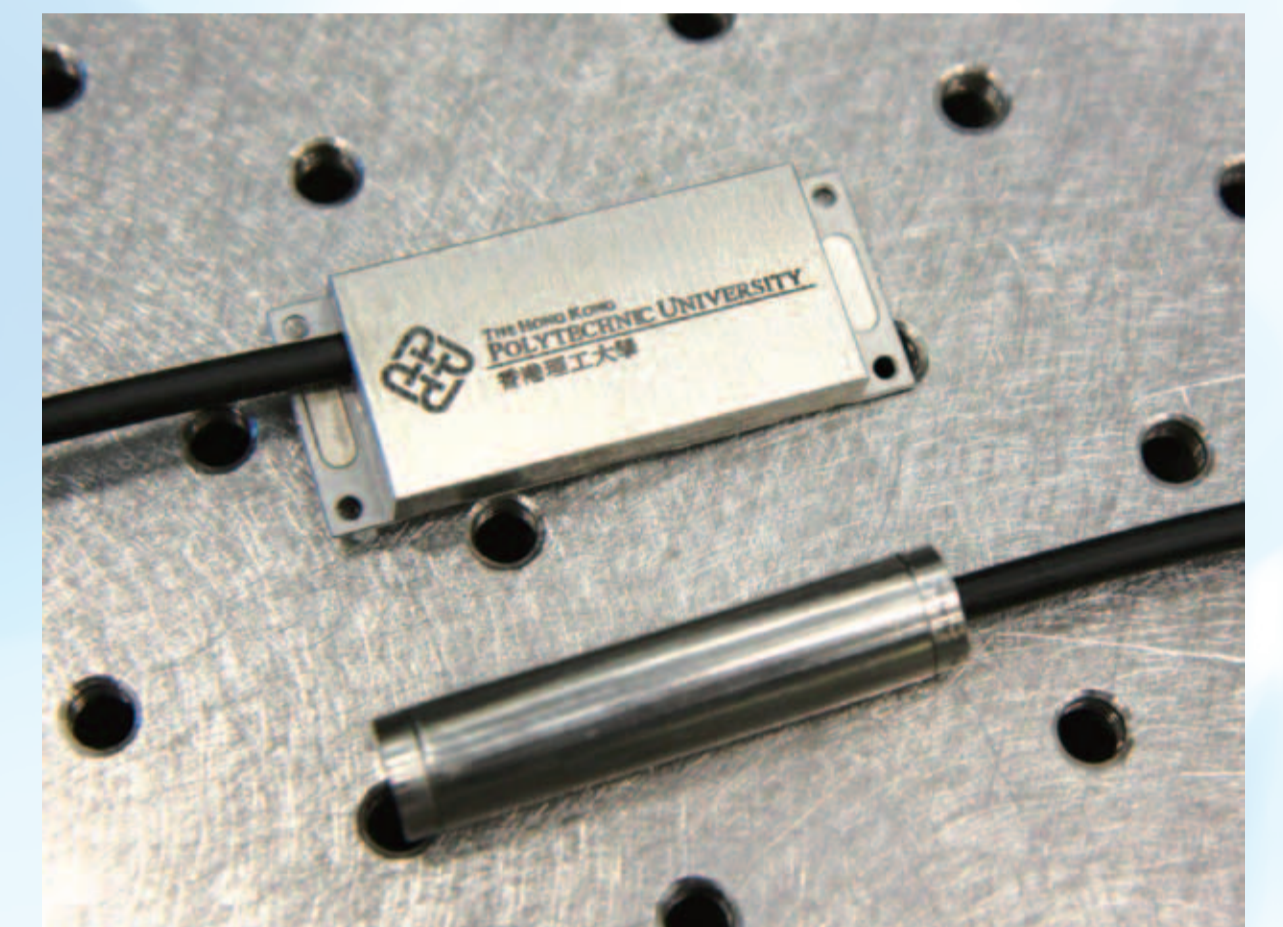
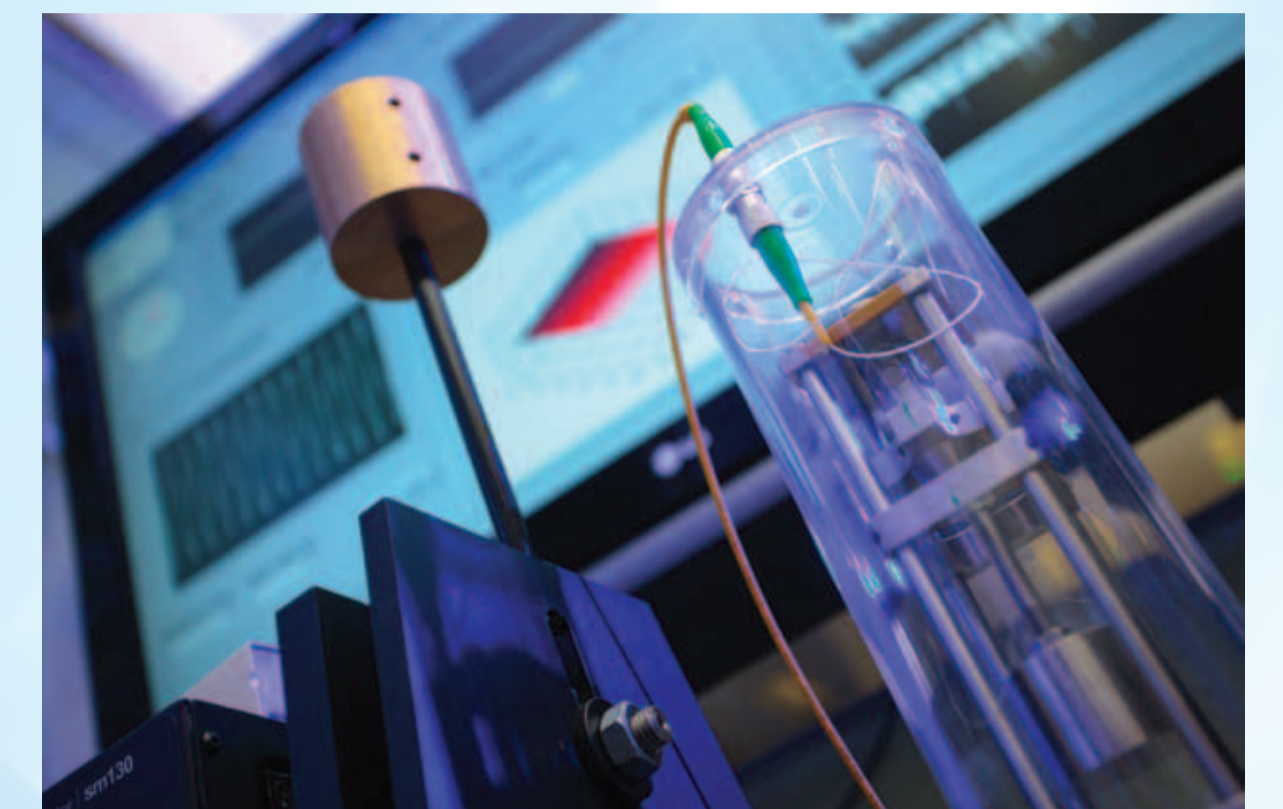


Advanced Railway Monitoring System 精密鐵路監測系統

Current challenges

To materialize the concept of "one hour living sphere", the national High-Speed Rail network connecting the major cities is developing and expanding very rapidly across the nation. Yet, the safety remains a major concern especially when people's expectation on train speed, railway lines and carrying capacity becomes higher and higher. Raising railway safety standards will help alleviate public concern on safety. Therefore, a comprehensive, reliable, real-time and all-day monitoring system is required to provide crucial information on railway conditions for engineering staff.



Our solutions

PolyU's inter-disciplinary research teams have developed a cost-effective and reliable railway monitoring system, helping to uphold the railway safety. This system has adopted many different types of advanced technologies including Fiber Bragg Grating Sensor, Self-sustainable Magnetolectric Smart Sensor, Interferometric Synthetic Aperture Radar, Optical Fibre Wind Pressure Sensor, Optical Fibre Hydrostatic Level Sensor, Ultrasonic Wave Technology and Laser Actuating/Sensing Technology. Not only does it monitor the health conditions of bridges, tunnels, tracks, train bodies, bogie frames and wheel axles, but it also detects the land deformation to keep rail from sagging. Besides, the system will provide real-time data such as distance between trains.

Impact to the world

PolyU's strong track record in its applied research for railway safety enables the research teams to take part in other related research projects in Hong Kong, Singapore, India and the Chinese mainland. Such engagement will contribute to further research and development in this area. It will also allow PolyU's novel railway monitoring technologies to become the core reference of the new international standard for railway safety monitoring.



目前之挑戰

高鐵為市民提供了安全、快捷、方便、舒適、省時的可持續發展交通運輸系統，以促成各地區的「一小時生活圈」。但隨着列車的速度不斷提高，路線和載運量日益增加，高鐵系統出現的任何微小問題，都可能做成重大的威脅。因此，我們需要一套精確可靠、自動化、全天候的監測系統，幫助工程人員24小時了解高鐵運輸系統的狀況。

理大之解決方案

理大鐵道工程跨學科研究團隊開發了「先進鐵路監測系統」，集合了多種不同的監測技術，包括：光纖光柵傳感技術、高智能磁電傳感器、合成孔徑干涉雷達、光纖風壓感測器、光纖水準儀、超聲波監測技術和礮射驅動感應技術等。該系統對鐵路系統的狀態進行全面的監測，能夠24小時無間斷自動化監測及分析橋樑、隧道、路軌、車體、底盤和輪軸等結構的健康，並且監測土地變形，避免路軌下陷。系統亦實時量度列車之間的距離、列車兩側負重等數據。

對世界之影響

理大的鐵路監測專家參與了本港、新加坡、印度和中國內地等鐵路系統的研究項目，從而進一步提升鐵路的結構健康與安全標準。除了對鐵路監測技術的研究及發展有所貢獻，理大嶄新的鐵路監測技術亦有可能成為國際鐵路安全監測標準的核心參考。

