

Hardik Mandani

CPEng, NER, RPEV, RPEQ, APEC Engineer, IntPE(Aus), MIEAust

Area of Practice: *Electronics, Electrical and Telecommunications*

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SUMMARY

Accomplished Chartered Engineer with extensive experience in electronics, telecommunications, and electrical engineering, specialising in complex product development, advanced real-time data capturing, and critical control systems. Proven track record in designing battery operated electrical and electronics condition monitoring systems, IoT edge computing solutions, and embedded programming, delivering projects from concept to completion in compliance with local safety regulations and international standards, including IEC compliance. Skilled in hardware development, project management, and engineering documentation for industry applications, working closely with multidisciplinary teams to drive workflow optimisation, systems integration, and continuous improvement. In addition to engineering expertise, serve as a technical supervisor for university students and as a trainer for IPC standard, delivering professional instruction for manufacturing and testing best practices. Adept in CAD tools to support system design, manufacturing engineering, quality assurance, and reliability analysis.

KEY ACHIVEMENTS

- Extensive knowledge of both **hardware and software solutions** for a wide range of sensors and various communication protocols
- Contributed to the end-to-end development of **10+ complex products** from design to commissioning, utilizing microcontrollers (AVR, PIC, STM), networking technologies, FPGA development with NI LabVIEW, as well as **sensor interfacing and power management** solutions.
- Contributed in Embedded system development including **advanced IoT systems with edge computing capabilities**
- Authored, updated and reviewed **50+ confidential QMS documents** such as design, maintenance, test, commissioning and non-compliance reports, including wiring and systems diagrams
- Certified in **Altium Essentials and Harness Design**, with experience designing **100+ PCB** layouts ranging from small-scale boards to large, complex designs.
- Led the **integration of IoT and control systems** for mining and rail assets, enhancing operational visibility and data reliability with safety standards.
- Strong knowledge of **embedded sensor interfacing** techniques and **data analysis**, with practical experience using **Python, Tableau, and machine learning techniques**
- Assisted in development of standard **manufacturing practices and test procedures** for Next Gen Instrumented Revenue Vehicle

EXPERIENCE

Senior Engineer – Embedded Systems

Feb '23 — Present

Melbourne, Australia

Professional staff on industry projects, Monash Institute of Railway Technology

Railway consulting and applied research group at Monash University, specializing in providing cutting-edge technological solutions to international and local mining and rail transport operators (<https://www.monash.edu/irt>)

Responsibility and Achievements

- Led **system development and deployment** for Next Gen Instrumented Ore Cars focusing on power distribution, embedded control systems, sensor interfacing and signal processing systems integration.
- Ensuring compliance with **local and international customers** and industry quality standards, achieved a 15% improvement in manufacturability, maintainability and cost efficiency.
- Developed manufacture and **test procedures** for FPGA (LabVIEW) based condition monitoring system using National Instruments hardware
- Providing regular operational support to existing and new (40+) IOCs, including **sensor calibration check, system health check, noise check and final hardware commissioning**
- Troubleshoot **communication interfaces** (cellular, satellite, GPS, I2C, SPI, CAN, RS485, RS232, MQTT) to improve performance in 40+ active railway condition monitoring systems.

- Tested, and integrated various embedded sensors for state-of-the-art railway condition monitoring system on site and in lab, ensuring reliability in **rugged environments**.

Research Engineer – Internet of Things (IoT)

Jan '20 — Feb '23

Melbourne, Australia

Swinburne University of Technology, Professional staff on industry projects

The leading IoT lab in Australia, dedicated to developing IoT solutions aimed at delivering substantial business outcomes across diverse sectors including manufacturing, agriculture, retail, and defence

- Designed and delivered advanced troubleshooting methods for **Next-Gen IoT systems**, improving reliability through structured problem-solving and system testing.
- Developed advanced IoT device using communication protocols (SPI, I2C, UART, MQTT, Bluetooth, Ethernet, Modbus, CAN) and conducted performance optimisation using **real-time edge computing techniques**.
- Executed full lifecycle embedded system development, including **bare-metal microcontroller programming**, PCB assembly, soldering, and validation to IEC standards.
- Led R&D for a battery-powered data capture PCB for **Bega Cheese** (+20% power efficiency) and contributed to an RFID-based **IIoT** system for **AMPC** (+30% responsiveness).

Academic Tutor

Aug '19 — Feb '23

Melbourne, Australia

Swinburne University of Technology – IoT programming, Fundamental of Data Science

- Guided emerging engineers for end-to-end IoT system development in the fields of **IoT** and **real-time edge computing**

Service Engineer

Feb '19 — Dec '19

Melbourne, Australia

Ingenico Group – A leading FinTech EFTPOS manufacturer

Embedded Development Engineer

May '16 — Feb '17

Ahmedabad, India

Teckrider Technologies

Research And Development Engineer

Jul '14 — Apr '16

Ahmedabad, India

Divolqa Technonics

EDUCATION

Master of Science in Electrical and Electronics Engineering,

Feb '17 — Dec '18

Swinburne University of Technology

- Achieved **Best Poster Award** for demonstrating exceptional engineering problem-solving skills by extending IoT device's operation time from 1 day to 1 year using advanced **sleep and transmission algorithm**

KEY PROJECTS AND CONTRIBUTIONS

Project Name	Industry Partner	Country
✓ Next Generation Instrumented Ore Car (IOC)	Rio Tinto	Australia
✓ Next-Gen system health and safety monitoring prototype	Rio Tinto/FMG	Australia
✓ Machine vision ballast condition monitoring prototype	MTR	Hong Kong
✓ Rail wheel and track temperature monitoring system	FMG	Australia
✓ Instrumented ore car / revenue vehicle	QR, FMG, Royhill	Australia
✓ Critical 3G to 4G migration of 33 IOCs	Rio Tinto	Australia
✓ Wireless automatic meat product counter	ARTC	Australia
✓ Wireless low-cost milk temperature measurement unit	Bega Cheese	Australia
✓ Low-cost IoT-based building access controller prototype	NIDAC	Australia
✓ Wireless low-cost fuel tank temperature measurement	LOB	USA
✓ Wireless single-phase home automation system	Techrider	India
✓ Various small-scale projects		

REFERENCE

Available on request