Phil Maker

Member

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Summary

Most of my work has involved the development of embedded systems with safety and reliability requirements including devices such as high penetration renewable power systems. Typical tasks have included:

- Systems architecture, design, implementation and testing.
- Automated testing, formal methods, code inspection, program proving.
- Protocol development.including development of distributed control protocols and data historians.
- Owners Engineer and detailed modelling.

Selected Projects

2020-.. Laot – building a provably secure device in order to protect critical infrastructure and legacy systems using seL4 and formal methods.

2014-19 SETuP – deploying 25 medium and high penetration PV/Diesel/ESS systems across remote communities in the NT.

2010 Ross Island Wind Energy – developing a wind/dieseel/energy storage system for Ross Island in Antarctica. bases in Antarcitica.

1990 Implantable Defibrillator – developing one of the first software controlled implantable defibrillators. Other work included the development of an automatic testing framework and formal specications. My final work involved the use of right ventricular pressue as a measure of cardiac output.

Work Experience

2020-... MTS, Laot Project – developing the laot system system

2013-... Adjunct Research Professor, Alaskan Center for Energy and Power – testing renewable power systems.

2018-2019 Senior Engineer, *Enernet* – design, modelling and specifications for power systems.

2011-2018 Senior Controls Engineer, *Powerwater* – design, modelling and specifications for power systems including SETuP and OSIsoft PI.

2000-2011 Principal Engineer, *Powercorp* – design, modelling and specifications for power systems including the development of distributed control systems, flywheels and low load diesels.

1990-2000 Lecturer B, *NTU (now CDU)* – Lecturing in Computer Science in subject aras such as Operating Systems, Concurrent Programming, Graphics and Networking.

1985-1990 Principal Engineer, *Telectronics* – developing one of the first implantable defibrillators. Tasks included signal processing, formal specification, verification and validation. The system was one of the early use cases for formal methods (Z) in life critical and achieved high reliability.

1979-1984 Trainee, *Applied Physics, AAEC* – programming PDP-15, 22, 11/23 for the 3MeV accelerator.

Education

1979–1983 **B.Maths, Computing Science**, *University of Wollongong*.

1984 **B.Sc (hons), Computing Science**, *Australian National University*.

2012 **Industrial Control Systems Advanced Cybersecurity Training**, *ICS-CERT*.

References: others available on request

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RE Projects

2014-2018 SETuP: a utility deployment of medium and high penetration PV/Diesel/ESS systems funded by ARENA with a total cost of around 55M$.

- Daly River: high penetration Diesel/PV/ESS system using Qinous Energy Storage.
- Apatula, Areyonga, Arlparra, Atitjere, Bulman, Daly River, Galiwinku, Gapuwiyak, Gunbalanya, Kaltukatjara, Kintore, Lajamanu, Maningrida, Milingimbi, Milyakburra, Minjilang, Minyerri, Mt Liebig, Ngukurr, Nyirripi, Ramingining, Titjikala, Warruwi, Wurrumiyangam, Yuendumu - medium penetration PV/Diesel systems using existinig power systems.
- Related projects and works including protection testing, communications and sky camera trails.
- Low Load Diesel controls and testing.

2012-present ACEP test facility development *UAF*

2000-20012 Projects within Powercorp (now ABB Microgrids):

- Australia: Denham, Bremer Bay, Hopetoun, Esperance.
- Antarctica: Ross Island and Mawson.
- Azores: Graciosa and Flores.

Products

2004-.. Development of the predecessor to the current ABB distribributed microgrid system (M+)

. 2003-2006 Development of Flywheel Energy Storage Systems

. 2002-2004 Low Load Diesel

1985-1990 Guardian Implantable Defibrillator. "And we had demonstrably the most reliable real time software ever written. After amassing several thousand implant years we measured a bug rate of less than 1 per 10,000 lines of code."

Presentations

2014 *"Energy Storage in Remote Australia: conniptions and kerfuffles"* - invited talk for the the Alaskan Energy Conference.

2010 *"A Brief History of High Penetration Systems"*, CSIRO International Minigrids Workshop, November 2010.

2008 *"Applying Smart Grids in High Penetration Renewable"*, National Smart Grids Forum, Sydney, September 2008.

Papers

1998 *"Filtering considerations in an implantable defibrillator that senses the modulation of right ventricular pressure as a measure of, haemodynamic compromise"*, 1990, North American Pacing and Electrophysiology Conference.

Patents

1990 *"Differentiating between arrythmia and noise in an arrythmia control system"*, 1990, U.S. Patent 4,960,123. European Patent EP 334618.

1991 *"Apparatus and method for detecting and treating cardiac tachyarrythmias"*, 1991, U.S. Patent 5,063,928.

1992 *"Implantable automatic and haemodynamically responsive cardioverting and defibrillating pacemaker with means for minimizing bradycardia support pacing voltages"*, 1992, U.S. Patent 5,105,810. European Patent EP 468720.

1993 *"Implantable haemodynamically responsive responsive cardioverting and defibrillating pacemaker"*, 1993, U.S. Patent 5,184,614. European Patent EP 488512.