Richard Clifford-Smith
Electronic Engineer

Personal Profile

I am an electronic engineer with **thirteen years' experience**. My background is in physics and I have **extensive practical and design experience** in both analogue and digital electronics. I am able to apply my wide physics and engineering knowledge to new tasks and this often leads to my seeing **innovative solutions** to engineering problems. I consider my **problem solving skills** and ability to come up with original ideas to be the most important part of my engineering skill-set. I can use a wide range of engineering tools, simulation software and test equipment.

I have always been interested in engineering and design outside of work. Over the years I have undertaken many personal projects ranging from repairing electronic circuits to designing and constructing a fully working motor-trike. This has enabled me to increase and maintain practical engineering experience and skill. I am interested in computers and have a good knowledge of hardware, software and programming techniques.

Work Experience

ASH Wireless Electronics Ltd. / Captec UK Ltd.   2015 – 2023
Senior Consultant Engineer – Chief Electronics Engineer

At ASH I designed the electronics for a multi-channel, wireless monitoring device for use in electrical substations[3], together with all accessories. I was responsible for ensuring it met its specifications. Later this knowledge in energy distribution was applied to the design of a **novel** semiconductor-assisted, microohm switching mechanism[2][6] for use in space-constrained environments. This switch became the basis of a three year development project in which I **led all electronic and mechanical design**, whilst working closely with the software development team and the customer's compliance and safety engineers.

I led **EMC compliance** at ASH, and developed a solution to enable a contactless payment system to meet strict aviation standards whilst simultaneously meeting conflicting card-payment-industry requirements. I also worked extensively on **safety-critical** rail braking systems, gaining knowledge of **SIL design principles** and undertaking **FMEA**s.

From January 2021 I became **responsible for all electronics design** at ASH and later within Captec. I have provided **technical leadership and mentoring** for our team of three junior embedded engineers and have been heavily involved in **sales and bidding** activities, representing Captec's embedded systems engineering capability to customers.

Throughout my time at ASH and Captec, I have become responsible for the design and specification of **complex systems**, as well as detailed component-level design work. I **defined the processes** for electronics development within the organisation.

Roke Manor Research Ltd   2010 – 2015
Graduate Engineer – Senior Engineer

Whilst at Roke I worked on a wide range of tasks that have included theoretical modelling, practical prototyping and design for production. I was involved in the design and verification of **safety-critical** control electronics for a high power RF system. I produced thermal models of equipment **from first principles** which subsequently lead to a change in hardware design. I designed and constructed demonstrator systems for Roke's novel surface wave communications system including extensive debugging of the initial systems and the **embedded control software**. I regularly attended **customer meetings**, engaging with the customers for **requirements capture**, technical discussion and progress reporting.

I had **sole responsibility** for the design and construction of a high-voltage discharge system for creation of high amplitude acoustic impulses with specific spectral properties. In addition to the HV system itself, my task included HV **system safety procedures,** safety documentation and the design of filtering to protect both the equipment under test and the users from induced voltages or fault conditions.

I gained experience of both one-off contract R&D projects and of product development **from concept to production**, applying the different **engineering processes** applicable to each. I benefited immensely from the opportunity to learn from other extremely talented engineers at this organisation.

Key Skills and Competencies

- Problem solving
- Ability to apply physics and engineering knowledge to a wide variety of applications
- Analogue, digital and RF electronics design
- Team leadership and mentoring
- Prototyping skills (electronic and mechanical)
- Design for manufacture
- Schematic capture and PCB layout in Altium (advanced)
- Technical review
- Test and measurement (including initial bring-up, design verification and production test)
- Electronic modelling in SPICE (advanced)
- Authoring of technical documents and processes
- System design
- Customer-facing communication skills
- Design for EMC, pre-compliance testing
- Microcontrollers and embedded software
- Automated test equipment, including its control software
- Requirements capture
- Project planning, estimation and bidding
- Compliance validation and testing
- Radio protocol specification and design
- Micropower electronics design (supply currents nanoamps to microamps)
- Experience of the patent application process
- Modelling of antennas and other electromagnetic structures in HFSS, NEC and Comsol
- Experience of high voltage testing including experiment design and safety case
- Version control and ticketing systems

Academic Qualifications

MPhys (hons) Physics
University of Exeter 2006-2010

A Levels: Electronics (A), Maths (A), Physics (A), Chemistry (A)
Brockenhust College 2004-2006

Other Qualifications

- PCB design for EMC
- High voltage awareness and electrical first aid
- 4×4 driver training

Interests

- Travelling
- Mountain walking
- Home electronics projects such as constructing test equipment for my own use
- Mechanical design in openSCAD for 3D printing

Additional Information

- Full UK driving license
- Working knowledge of German

References

Available on request.

Online Resources

1. http://www.randomfunprojects.co.uk/ (personal website)
2. https://innovation.ukpowernetworks.co.uk/wp-content/uploads/2021/11/CIRED-2021_Paper-0100_Active-Response_LBS.pdf
3. https://www.ashwireless.com/pages/48-kelvn-remote-monitoring-system
4. https://www.ashwireless.com/pages/32-jet-engine-heat-transfer-telemetry
5. https://www.ashwireless.com/pages/43-energy-and-data-via-one-optical-fibre
6. https://www.ipo.gov.uk/p-ipsum/Case/ApplicationNumber/GB2014529.8