Richard Clifford-Smith
Electronic Engineer

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Personal Profile

I am an electronic engineer with nearly **five 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

Roke Manor Research Ltd **2010 - Present**
Senior Engineer

Whilst at Roke I have worked on a wide range of tasks that have included theoretical modelling, practical prototyping and design for production. I have been involved in the design and verification of **safety-critical** control electronics for a high power RF system. I have produced thermal models of equipment **from first principles** which subsequently lead to a change in hardware design. For a recent project, 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 have regularly attended **customer meetings**, engaging with the customers for **requirements capture**, technical discussion and progress reporting.

I have 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 have benefited immensely from the opportunity to learn from other extremely talented engineers at this organisation

High Voltage Acoustic Source

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. Starting from published research I determined the required discharge energy and configuration to produce the desired acoustic impulse. I designed the mechanical parts for the discharge electrodes and ozone suppression system which were manufactured in-house and then assembled by myself. I also designed and constructed the additional parts required to safely discharge the stored energy. 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 both in normal operation and under fault conditions.

The customer's equipment had not been designed to perform in the extreme electromagnetic environment present in the high voltage chamber and I identified reversible EMC improvements which could be made to allow testing to continue without the need for permanent modification of the hardware. This also simplified the post-processing of the acquired data with a resulting cost saving. During the course of this project I also identified and resolved a long-standing issue with the high voltage chamber control system.

Hand-Held Counter-IED Equipment

This project under a UK MoD Urgent Operational Requirement (UOR), required taking a single demonstrator prototype into a durable, deployment ready equipment to be sent out to an active theatre. Working as part of a multi-disciplinary team I developed the electrical and electronics parts of the system as well as designing and building test fixtures and performing performance tests, debugging manufacturing problems and compiling the technical file for regulatory compliance and ongoing successful manufacture. I personally supervised the manufacture of the first batch at the subcontractor's site, providing clarifications to the build instructions which were later up-issued to incorporate these changes. The project delivered under budget and early and has been successfully used by operators in the most demanding of situations.

A later requirement of this product was to add additional functionality without compromising its industry leading capabilities. I conceived an alternative wireless coupling method to the originally intended technique to achieve this, by building and testing a demonstrator I showed that it gave the functionality with minimal modifications to stock parts. This enabled the project to substantially reduce the engineering time and materials required to again deliver early and substantially under budget to a very impressed customer.

Vehicle Mounted Electronic Countermeasures System

This project was a step change in scale from my previous work but using sound engineering knowledge, pragmatic team work and hands-on capability I applied myself to many areas of it including the power generation, distribution and control systems. With an exceptionally aggressive schedule I helped deliver a unique system with globally unrivalled performance. I worked at multiple sub-contractors sites to assist their work on the project and supported the customer's field trials, often responding at a moment's notice.

A last-minute performance problem required a significant change to the power distribution system, buried deep inside the system it would require days of logistics and heavy lift equipment to access and modify. I proposed an alternative method which could be retrofitted in the field with minimal disruption to the system and requiring no more access than was currently available and using affordable, off-the-shelf parts. This modification was applied by myself and my colleagues on-site, in one day and increased system performance up to the required level.

Other

2009 Software to perform thermocouple conversions for a calibration company.
2007 Produced a website for community playgroup compliant with the HTML 4.01 specification.

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
- Prototyping skills (electronic and mechanical)
- Design for manufacture
- Schematic capture and PCB layout in Altium
- Authoring of technical documents
- Technical review
- Test and measurement (including initial bring-up, design verification and production test)
- Modelling of antennas and other electromagnetic structures in HFSS and COMSOL
- Electronic modelling in SPICE
- Experience of high voltage testing including experiment design and safety case
- 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
- Environmental testing

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

- Roke Graduate Development Programme
- PCB design for EMC
- High voltage awareness and electrical first aid
- 4x4 driver training

Interests

- Mountain walking
- Home electronics projects such as constructing test equipment for my own use
- Maintaining a personal website: http://www.randomfunprojects.co.uk/

Additional Information

Full UK driving license
Basic knowledge of German

References - Available on request.