

## Stuart Hall

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### PROFILE

A highly proficient **Technical Manager, Systems Engineer** and **DSP Specialist** with 20 years development experience and comprehensive knowledge of satellite communication systems. Fully conversant with product lifecycle and extensive experience of real-time embedded DSP applications and high-efficiency, structured software design. An inspirational leader and mentor with excellent communication and inter-personal skills.

UK security cleared and available for consultancy or contract opportunities.

### EXPERTISE

- Satcom system design - RF & digital hardware, firmware & software
- Project management, team leadership, line management
- Design for manufacture, price-sensitive commercial products and systems
- Requirements capture, architectural and detailed design
- DSP algorithm development and real-time implementation
- Modulation, acquisition, demodulation, channel equalisation
- FEC coding, Viterbi and turbo decoding
- Speech coding, echo cancellation, tone detection, ISDN, POTS, fax
- Circuit-switched and packet-switched protocols
- Software engineering, object-oriented design, UML
- C, C++ and assembler for DSP and real-time embedded
- RTOS, DSP-BIOS, POSIX, Nucleus
- Device drivers, board-level debugging, OnCE
- Code Composer Studio, Visual Studio.net, VisualDSP, Matlab, Mathcad
- Inmarsat BGAN, GAN, MPDS, Mini-M for aero, land and maritime products

### RECENT ACHIEVEMENTS

- Led the development of a satcom system for broadcasting differential GPS augmentation data.
- Acted as team lead and principal author of a technical proposal for a sophisticated signal detection system for use by UK MOD.
- Captured detailed requirements for all physical layer aspects of a new handheld satcom voice/data terminal based on the GMR2+ air interface.
- Designed system architecture and led a team of 6 to design, integrate and test a multi-channel RF system for an aeronautical satcoms channel cards.
- Managed project and provided technical lead to port a highly complex channel equaliser onto third party hardware. Delivered on time and slightly under budget.
- Designed a set of portable, highly-efficient, fixed-point DSP classes, enabling rapid implementation of complex algorithms in an object-oriented manner.
- Identified opportunity to reduce product manufacturing costs through improvements to production software. Designed algorithms and led development; resulting in better accuracy, increased reliability and a 4-fold speed improvement.
- Defined requirements and interfaces for various third-party software modules and successfully integrated them into commercial products.

## **QUALIFICATIONS**

MSc in Digital Signal Processing (1993)

BSc (Hons 2:1) in Electrical & Electronic Engineering (1987)

MIET (Member of the Institution of Engineering and Technology)

## **PREVIOUS EXPERIENCE**

### **Tewkesbury Satellite Communications Ltd**

Sept 08 to present

#### **Director & Principal Consultant**

Providing consultancy services to clients involved in the design, manufacturing and use of a wide variety of communications products and systems

Specialist services include:

- Systems engineering
- Physical layer
- DSP software
- Real-time Embedded software
- Documentation
- Quality reviews

Visit [www.tewkesburysatcom.co.uk](http://www.tewkesburysatcom.co.uk) for details.

### **EMS Satcom UK Ltd**

April 02 to Sept 08

#### **Technical Manager**

Engineering design authority and system architect on several parallel projects.

Responsibilities included:

- Technical liaison with customers and suppliers, requirements capture and specification of deliverables
- Architectural design of systems, digital hardware, firmware and software.
- Design for manufacture and production test software
- Delivery of board support packages to enable third party system integration
- Delegation and supervision of work packages: DSP and real-time embedded software, VHDL, JTAG, PC-based utilities and production test software
- Documentation of requirements, architectural and detailed design, test plans and test results
- Presentations to internal and external audiences
- Line management, recruitment, appraisals and mentoring
- Project planning, resource planning and management of multiple project schedules.

#### **Principal Engineer**

DSP design authority and leader of a team of 6 developers, covering system architecture and all aspects of DSP design and development for several Inmarsat satcom products.

Responsibilities included:

- System architecture and detailed DSP software design down to module level
- Algorithm development and real-time embedded implementation in multi-threaded environment using DSP-BIOS RTOS
- C, C++ on TMS320C6414 and TMS320VC33
- Development of portable, high-efficiency C++ classes for fixed-point DSP
- Design of physical layer DSP software modems for Inmarsat Aero GAN and BGAN systems (see below)
- Integration of third-party supplied speech codecs: AMBE and AMBE+2 and G.165/G.168 echo cancellers
- Demonstrations and informal and formal testing for type-approval
- Documentation and presentations.

- Specification of third-party software requirements, management of delivery, acceptance testing and system integration.
- Project scheduling, planning and delivery of multiple milestones
- Delegation and supervision of DSP software work packages

Physical-layer DSP systems developed:

- Aero BGAN modem, which provides variable rate services up to 512 kBit/sec using asymmetric forward (TDM) and return (TDMA) channels. It uses variable modulation types (QPSK,  $\pi/4$ -QPSK, 16-QAM); symbol rates from 8.4k to 151.2 kSym/sec and 15 different channel coding rates. Receiver design incorporates special turbo-equalisation and interference-cancellation techniques to maximise performance in aeronautical fading channels. Transmitter design incorporates precise burst timing synchronisation to received forward channel.
- Aero GAN modem, which provides low-rate and high-rate (64 kbit/sec) circuit-switched voice/data services over symmetric SCPC channels. Low-rate (Mini-M) uses O-QPSK at 2.8 kSym/sec with FEC coding; high-rate uses 16-QAM at 33.6 kSym/sec with fixed-rate turbo coding. The high-rate receiver design incorporates a Kalman smoother channel equaliser and 16-state turbo decoder.

**Ottercom Ltd**  
**Senior/Principal DSP Engineer**

April 96 to April 02

DSP software design for Inmarsat Mini-M, B and M4 range of products including algorithm development and real-time fixed-point implementation:

- Detection, acquisition and demodulation of BPSK, O-QPSK and 16-QAM signals with various channel degradations close to Shannon limit
- Modulation, pulse-shaping and pre-distortion
- FEC and Turbo coding/decoding.
- Fractional interpolation/decimation.
- LPC and AMBE speech coding and echo cancellation.
- Formal type-approval testing and documentation
- Supervision of 2 developers
- C and DSP assembler on TMS320C3x and Motorola DSP563xx

**TRL Technology Ltd**  
**Design Engineer**

Feb 94 to April 96

Software design and implementation for Inmarsat M/Mini-M products:

- Implementation and testing of Fax and Data interface units
- Design, development and testing of detector/demodulator for BPSK bursts with very poor SNR
- Specification, Integration and testing of IMBE speech codec
- Built-in Test Software
- C, DSP assembler on Motorola DSP56xxx
- Customer liaison

Previous experience

Postgraduate study (MSc)	Sep 92 to Nov 93
Travel/overseas & temporary employment	Nov 89 to Sep 92
Amada Metreco: Field Service Engineer.	May 89 to Nov 89
Ferranti plc: Student Engineer, Process Technologist.	Sep 83 to May 89

**INTERESTS & PERSONAL**

Sailing, Gliding, Skiing, Squash, 5-a-side football, Physics and Astronomy

DOB: 1965

Nationality: British