

CURRICULUM VITAE

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Profession: Chartered Electrical Engineer, C.ENG.FIEE
Personal Details: Widower
Date of Birth: 10.09.39

Qualifications:

a) Diplomas

- (i) Diploma in Electrical Engineering set by the Institution of Electrical Engineers IEE. Final year subjects included:

Electricity Supply, Utilisation of Electrical Plant and Advanced Electrical Engineering, obtained 1969.

The academic standard of the examination leading to the award of the diploma in Electrical Engineering by the Institution of Electrical Engineers has been recognised by a competent authority of HM Government as being equivalent to that of a First Degree in Electrical Engineering awarded by Universities in the United Kingdom of Great Britain and Northern Ireland.

- (ii) Diploma in Acoustics and Noise Control plus six endorsement subjects set by the Institution of Acoustics obtained 1985.

b) Membership of Institutions

- (i) C.ENG. MIEE achieved in 1974
C.ENG. FIEE achieved in 1994
- (ii) Membership of the Institution of Acoustics MIOA gained in 1986.

Main Experience:

a) Apprenticeship, 1955 to 1960

Served a five-year electrical engineering apprenticeship with an electrical engineering company.

b) Components, 1960 to 1963

Examination and Inspection of Electrical Components with industry and the Ministry of Aviation.

c) Contracts, 1963 to 1967

The correlation of manufacturing details for contract work with the Ministry of Aviation.

d) Calibration/Assessment/Auditing Services, 1967 to 1984

(i) Providing a calibration service for high-grade electrical standards for the Ministry of Defence, Services Electrical Calibration Centre (SESC). Seven-day turn round achieved and the generation of Certificates of Calibration was computerised. 1967 - 1972.

(ii) Provided a measurement audit and consultancy service for the armed forces and Ministry of Defence Contractors. Achieved a seven-fold increase in the number of laboratories audited between 1973 to 1978.

(iii) Senior Quality Officer and Head of all SESC "AQUILA", DC and LF Electrical standards and Calibration Laboratories. This involved the management of a staff complement of thirty-one technical and industrial grades and being the NAMAS/UKAS Deputy Head of Laboratory for accreditations Nos. 0033, 0124 and 0144. Duties included the supply of technical information, a DC/LF Electrical and Acoustic Calibration Service to industry and the Armed Services, participation in quality assessment services for the Ministry of Defence, the National Supervisory Inspectorate for the British Standard Institution [NSI/BSI]. The SESC laboratories were the first to receive NAMAS accreditations for acoustic measurements and automated systems. 1978 to 1984.

e) Accreditation, 1984 to 1998

Head of Section for the United Kingdom Accreditation Service (UKAS) which is a Private Company Limited by Guarantee. Duties included:-

- Accreditation and surveillance of four calibration fields of measurement -
Electrical DC and LF
Electrical RF and Microwave (May 1997 to August 1998)
Magnetic Flux
Accelerometry
- Consultancy for industry.
- The Participation in the European Accreditation Body (EA) meetings.
- Lecturing at the IEE, NPL, IOA, Universities and Colleges on Electrical Measurements for United Kingdom and Overseas delegates.

Committee activities included:

- (i) Chairman (1991/93) and member (1990/95) of the IEE PG S4 Measurement Committee.
- (ii) Member (1998) and Vice-Chairman (1999/2001) of the IEE PGS4 Measurement Committee.
- (iii) Member and ordinary member of the IEE Science, Education and Technology Division committee (1991 to 1996).
- (iv) Member of the IEE Conferences and Vacation (1993/96) Schools Committee.
- (v) Membership of NPL, MoD, BMTA and UKAS Measurement Committees.
- (vi) Member of IEE Executive Committee on Measurements, Sensors and NDT (2001-2004).

During the period 1984 to 1998 the number of electrical laboratories accredited for calibration rose from 29 to 147. The section was financially viable. Notable electrical laboratory accreditations granted during this period included:

- The Hong Kong Government Standard and Calibration Laboratory [the first overseas laboratory to be accredited by NAMAS for fifteen years];
- The Royal Brunei Armed Forces Calibration Centre
- Eastman Kodak [the first electrical calibration laboratory to be accredited by NAMAS in the United States of America];
- Protocol [the first calibration laboratory to be accredited in Northern Ireland];
- C³T [the first calibration laboratory to be accredited in Greece];
- National Physical Laboratory NPL [the first major national laboratory to be accredited].

Notable parameters of measurement accredited include: DC Voltage directly against a Josephson Junction System [first of its type within EA], acceleration (reference grade accelerometers and part of an Euromet agreement), phase angle measurement, the electrical parameters of a transportable computer controlled multifunction transfer standard that is normally sent unaccompanied to the clients facility and the electrical parameters of NPL.

f) **Consultant 1998 to Present Time**

Consultant in the fields of metrology and quality assurance. Providing a service in measurement accreditation, measurement consultancy, quality auditing, metrology training and measurement audits In the UK, Israel, Ireland, Greece, Poland, Bulgaria and Brunei. Current assessor contracts with accreditation bodies to act as lead assessor and technical assessor include the following UKAS, ISRAC and INAB. Course tutor training activities have included:

- i) LBCS Ltd 2 Day Uncertainty of Measurement Course (2000/01/02/03/04/05).
- ii) LBCS Ltd Quality Audit Course (2000/03/04).
- iii) LBCS Ltd Measurement Procedure Course (2000).
- iv) LBCS Ltd Electrical Measurement Techniques Course Incorporating the requirements of ISO/IEC Standard 17025, ISO 43 Part 1 and ISO TAG 4 (2002/03/04)
- v) Sira's Calibration Principles Course (2000/01/03/04/05).
- vi) Sira's UKAS Accreditation Course (2000/01).
- vii) Sira's Laboratory Accreditation Course (2001/02/03). (based on ISO/IEC Standard 17025 course)
- viii) Sira's Electrical Calibration Accreditation Course (2000/01/02/03/04)

Publications Originated 1991-2008 (See Appendix 1)

Details of Career (See Appendix 2)

Training Records (see Appendix 3)

APPENDIX 1

Publications Originated 1991-2008

Articles have been accepted by IEE, ERA, BEMC, NPL, Electronic magazines and NAMAS/UKAS as follows: -

- a)** BEMC 91 "NAMAS 25 years of accreditation". November 1991.
- b) 1992 Winter Edition of NAMAS Newsletter.
- c) Articles for BEMC 91 and Birmingham Environmental Services 1992 - "NAMAS 25 years of Accreditation". January 1992.
- d) Article for Test Magazine - "NAMAS, Europe and Changes in Technology". February 1992.
- e) IEE Proceedings - A "Current Shunts in use in NAMAS Laboratories". 4 July 1992.
- f) ERA Conference Digest for High Voltage Measurements and Calibration - "NAMAS, Changes in Technology and European Co-operation". October 1992.
- g) IEE Engineering Science and Education Journal: -
 - i) Paper: "Professional Group S4 - Chairman's Report". December 1992.
 - ii) Paper: "NAMAS and European co-operation". August 1993.
- h) IEE Colloquium Digest No 1992/192 "The Training of Measurement Engineers and NAMAS Requirements". November 1992.
- i)* IEE Colloquium Digest No 1993/051 "The Status of NAMAS accreditation for Electrical Calibration Laboratories". February 1993.
- j) IEE Colloquium Digest No 1993/047 "NAMAS and European Co-operation". February 1993.
- k) Articles submitted for NPL Publications 92/93.
- l)* IEE Colloquium Digest No 1993/229 "NAMAS Accreditation for automated DC and LF calibration systems". November 1993.
- m)* IEE Colloquium Digest No. 1994/175 "The Evolution of Quality Control Standards for Calibration Systems over the Past Thirty Years".
- n)* IEE Colloquium Digest No. 1995/082:
 - (i) "Calibration present and future".
 - (ii) "Sampling of calibration system performance by measurement audits".
- o) IEE Engineering Science and Education Journal - Issue October 1995
 - (i) Editorial: "Calibration Awareness".
 - (ii) Paper: "The Evaluation of Quality Control Standards for Calibration Systems over the past Thirty Years".
- p)** BEMC 95:
 - (i) "Sampling of calibration system performance by measurement audit".

- q) IEE Colloquium, Digest No 96004
 - (i) "The verification of automated measuring systems".
- r) IEE Engineering Science and Education Journal - for publication in 1996
 - (i) "Sampling of calibration system performance by measurement audits"
- s)* IEE Colloquium, Digest No 96/099, 1996
 - (i) "Chairman's introduction".
- t) ERA High Voltage Conference, October 1996
 - (i) "Measurement accreditation of electrical laboratories".
- u) IEE Engineering Science and Education Journal - Accepted for publication February 1997
 - (i) "Measurement accreditation".
- v)* IEE Colloquium, Digest 97/161
 - (i) "UKAS AC Voltage Accreditation 1966-97".
- w)** BEMC 97
 - (i) "Calibration Awareness for all UKAS Accreditation Activities".
 - (ii) "Measurement Accreditation of Electrical Calibration Laboratories".
 - (iii) "The Evolution of Quality Control Standards for Calibration Systems over the Past Fifty Years".
- x) IEE Discussion Meetings 1997/98
 - (i) "New Aspects in Electrical Measurement Accreditation".
 - (ii) "NAMAS Practice for the Derivation and Statement of Uncertainties (M3003)".
 - (iii) "Accreditation in Europe and world-wide".
- y) IEE Engineering Science and Education Journal - accepted for publication August 1998.
 - (i) "New Aspects in Electrical Measurement Accreditation".
- z) IEE Colloquium Meetings 1999
 - (i) "Leads and connectors used in conjunction with measuring equipment to justify accreditation requirements of uncertainty statements" – Digest 99/019.
 - (ii) "The changing face of measurement audits" – Digest 99/048.
 - (iii) "The importance of uncertainty of measurement" – Digest 99/197.
- (a1) Cal Lab -The International Journal of Metrology July/August 1999.
 - (i) "Measurement Accreditation of *Electrical Calibration Laboratories*".
- (b1) Quality World – Institute of Quality Assurance – 1999.
 - (i) "the long and the short of it" – August 1999.

- (ii) “ensuring a full measure” – September 1999.
- (iii) “how standards for calibration came to be” – October 1999.
- (c1) The National Measurement Conference/ British Electromagnetic Conference – November 1999.
 - (i) “Good Measurement Practice”.
 - (ii) “ How National Measurement System – gaining the benefits”.
- (d1) Metrology Conference Israel - May 2000.
 - (i) “Measurement Accreditation of *Electrical Calibration Laboratories*”.
- (e1) Quality World – Institute of Quality Assurance – 2000.
 - (iv) “Accreditation of Automated Calibration Systems” – September 2000.
 - (v) “Good measurement Practice” – October 2000.
- (f1) IEE Brunei – 31 October 2000
 - (i) “Measurement Accreditation of *Electrical Calibration Laboratories*”.
- (g1) IEE Discussion Meeting – 6 December 2000
 - (i) “Measurement Accreditation of *Electrical Calibration Laboratories*”.
 - (ii) “ How National Measurement System – gaining the benefits”.
 - (iii) “Good measurement Practice”.
- (h1) The National Measurement Conference/ British Electromagnetic Conference – November 2001.
 The following 4 papers presented at this conference have all been updated on previous versions.
 - (i) “Good Measurement Practice”.
 - (ii) “Measurement Accreditation of *Electrical Calibration Laboratories*”.
 - (iv) “The Changing Face of Measurement Audits”
 - (v) “The Evolution of Quality Control Standards for Calibration Systems ”.
- (i1) Metrology Conference Israel - November 2003
 - (i) “Good Measurement Practice”.
 - (vi) "The Changing Face of Measurement Audits”
- *j1) IEE Colloquium Meeting May 2004 - Measurement Accreditation Update
- (k1) The National Measurement Conference/ British Electromagnetic Conference – November 2005.
 The following paper has been presented.
 - (i) “Good Measurement Practice- Calibration Control”.
- (m1) UKAS Day for Electrical Laboratories November 2005
 Why are we here/Building on the Foundations
- (n1) IEE Colloquium October 2007 – History of UKAS DC and LF Electrical Accreditations

*Meeting organiser **Member of Organising Committee

APPENDIX 2

Details of Career [in Chronological Order].

Dates	Organisation	Grade or Position	Duties
01.09.1955 to 31.08.1960	Electro-Construction Co Ltd, St Mary Cray, Kent.	Apprentice	Five year apprenticeship in Electrical Engineering.
01.09.1960 to 16.06.1961	As above	Factory Inspector	Examination and Inspection of Rotating Machines.
19.06.1961 to 01.06.1963	Ministry of Aviation, Bromley, Kent.	Mechanical Examiner	Examination and Inspection of Electrical Components.
04.06.1963 to 01.05.1967	As above	Technical Officer Grade 3	The correlation of manufacturing details for contract work.
04.05.1967 to 31.12.1972	Ministry of Technology, Bromley, Kent.	Technical Officer Grade 2	Technical Officer responsible for the day-to-day running of a DC and LF Calibration Laboratory.
01.01.1973 to 03.04.1978	Ministry of Defence, Bromley, Kent	Professional and Technical Officer Grade 2	Team Leader of MoD Electrical Audit Survey Team for Measurement covering DC to 40 GHz.
06.04.1978 to 21.04.1984	As above	Professional and Technical Officer Grade 1	Senior Quality Officer and Head of the Services Electrical Standards Centre, DC and LF Electrical Standards and Calibration Laboratory.
24.04.1984 to 31.07.1995	Department of Trade and Industry, Teddington, Middlesex.	Principal Officer Grade 7	Head of Section with responsibilities for the accreditation/surveillance of three fields of measurement, Electrical DC/LF, Magnetic Flux and Accelerometry.
01.08.1995 to 30.09.1998	United Kingdom Accreditation Service (UKAS) Teddington Middlesex	Section Manager	Head of Section with responsibilities for the accreditation and surveillance of four fields of measurement: Electrical DC/LF, RF and Microwave, Magnetic Flux and Accelerometry.
01.10.1998 to Present-day	Lawrence Bernard Cronin Services Ltd [LBCS Ltd]	Managing Director	Consultant in the fields of metrology and quality assurance. Providing a service in measurement accreditation, measurement consultancy, quality auditing, metrology training and measurement audits.

Appendix 3 - Training Records

Qualifications

Course	Title	Year
City & Guilds	Electrical Technician Certificate	1956-1960
Ordinary National	Electrical Certificate	1961-1962
Higher National	Electrical Certificate	1962-1964
Institution of Electrical Engineers	Diploma in Electrical Engineering	1965-1969
Institute of Acoustics	Diploma in Acoustics and Noise Control	1982-1984

Apprenticeship with Industry - Five year apprentice in electrical engineering 1955-1960

Training with the Ministry of Defence

Quality Assurance	Metrology	1961 - 1984
Defence 05 Series of Quality Standards – these standards were the fore - runners of BS 5750/5781 and the ISO 9000 Series of Standards.	Seminars, Colloquium, Conferences and Vacation Schools.	Training undertaken at various times during this period via on the job training schemes or attending courses.
National Supervisory Inspectorate for the British Standards Institute - Component approvals		Training undertaken during this period included various on the job training schemes in U.K., Ireland and Holland.

Training with UKAS/NPL/Department of Trade and Industry

Quality Assurance	Metrology	1984 - 1998
UKAS 4-day assessor's training course plus various Seminars, Colloquium, Conferences and Vacation Schools.	UKAS 4-day assessor's training course plus various Seminars, Colloquium, Conferences and Vacation Schools.	Training undertaken at various times during this period via on the job training schemes or attending courses.

Training with LBCS Ltd, Future Business College, NPL, Sira Test and Certification Ltd and UKAS.

Quality Assurance	Metrology	1998 - 2005
Various Computer Courses by the Future Business College.	Windows 95, Word 97, Excel 97, Access, Power Point, Front Page/Internet.	1998/1999
Various Videos (GMP), Seminars, Colloquium and Conferences.	Various Seminars, Colloquium and Conferences.	Training schemes or attending courses.
ISO/IEC Standard 17025 familiarisation Workshop.	ISO/IEC Standard 17025 familiarisation Course.	Sira training Workshop – March 2000
Auditing Quality Management System		Sira Training Course – 3 rd & 4 th July 2001
ISO 9000/2000 Transition Course.		Sira Training course – 26 th & 27 th November 2001
NPL Voltage and Current Workshop	Voltage and Current Measurement Workshop	NPL 23 rd September 2003
Society of Environmental Engineers.	Uncertainty of Measurement Convention	London 2 nd October 2003
UKAS	Familiarisation with UKAS requirements	UKAS Feltham 18 th November 2004
UKAS	UKAS Day for Electrical Laboratories	NPL Teddington 14 th November 2005
NPL	BEMC Conference 2005	NPL Teddington 17 th November 2005