

# Paul Geoffrey HARDY - Curriculum Vitae

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## Roles:

- **Consultant, presenter, and technical expert on digital mapping and GIS**
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## Profile:

I am an experienced and versatile software professional, with particular experience covering digital mapping, GIS, cartography, charting, geospatial data and data models, location services, automated generalisation, data re-engineering techniques, and software product engineering. All this is based on my experience of over 40 years at the leading edge of the digital mapping and GIS software industry. I bridge the gap between the technologists and the users, having worked both in software development and in business development.

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## Skills:

- Consultancy, from strategic analysis and advice, through technical options, platform selection and solution implementation, to performance analysis and problem solving.
  - Design of complete software systems, including customer visits and requirements analysis, through architecture design, implementation planning, to detailed system/module design.
  - Database design and data modelling of object and relational spatial databases, including Oracle and UML, ESRI Geodatabase, and Gothic object database.
  - In-depth knowledge of standard spatial data formats and data models: UK civilian such as OS MasterMap; international (ISO 191xx), open standards like OGC (SF, WMS/WFS/TWFSF), European INSPIRE models and national data models like TOP10NL; military like DFAD, DTED and VMAP (VPF/DIGEST); and hydrographic like S57 and DNC.
  - Operation of GIS, database, mapping, charting and graphics software, particularly ESRI products (ArcGIS Desktop and Server), and the Laser-Scan products (LITES2, Gothic LAMPS2, Clarity, Radius), but also MapInfo, Intergraph GeoMedia, Safe FME, Adobe Illustrator, etc.
  - Communication, including giving training courses, dealing with customers at all stages from pre-sales consultancy onwards, and information exchange within a company. I speak fluent French.
  - Software Engineering and Quality Assurance, including implementing software codes of practice.
  - Project management of software projects and combined hardware/software/data projects.
  - Technical and applications programming, with particular strengths in GIS, location services, digital cartography, graphics, object-oriented databases, and VMS systems. Language expertise includes "C", Fortran, SQL, PostScript, Java, Python, XML, etc.
  - Computer systems management, on Windows, Unix and VMS.
  - Trouble-shooting and problem solving, whether involving software, hardware, data, or procedures.
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## Qualifications:

- MA (Hons) Computer Science, Cambridge University, 1975.
  - MBCS (Member of the British Computer Society), 1988.
  - C.Eng (Chartered Engineer), 1990, CITP (Chartered IT Professional), 2004.
  - F.B.Cart.S (Fellow of British Cartographic Society), 2002
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## Experience:

Since 2016 I have retired, apart from very occasional consultancy.

- **Advising EuroGeographics** on ELF (European Location Framework) status and quality aspects.

From 2008 I worked for ESRI Europe as:

- **Business Development Consultant** – focused on the National Mapping Agency and Cadastral marketplace, being a trusted technical expert.

During 2007, I worked jointly for ESRI UK and ESRI Inc (Redlands California) - as:

- **Technical Solutions Consultant (ESRI UK)** – Advising large customers (governmental and commercial) on best use of GIS and ESRI technology.
- **Cartography Evangelist (ESRI Inc)** – Continuing aspects of the Product manager role described below, particularly the external communication.

I spent 3 years (2003-2006) at ESRI Inc in Redlands California - the market leader in GIS - as:

- **Product Manager for Cartography** – Defining and coordinating a company-wide vision for cartography, acting as evangelist and presenter to communicate that vision externally, writing white papers and articles, collecting business requirements and translating them into technical requirements for future releases.
- **Software Program Manager for Cartographic Representations** – In parallel, I managed a key software project to engineer advanced cartographic representation capabilities into the core of ArcGIS for the 9.2 release.

Before that I spent 28 years (1975-2003) at Laser-Scan Ltd, a world-renowned supplier of leading-edge solutions for digital mapping, charting, GIS, and spatial databases. During this time, I held following roles:

- **Principal Consultant** - Consultant and presenter, providing expertise on the full range of mapping and geodata software products to the benefit of current and future customers. Dissemination of product and industry knowledge. Clients for consultancy included government agencies like UKHO (the Admiralty), and commercial organisations like the AA (Automobile Association).
- **Chief Product Manager**, coordinating the future direction of the company's mapping and geodata software products, together with dissemination of product and industry knowledge.
- **Expert** on hot topics, e.g., on automated generalisation to derive mapping from base-scale data.
- **Technical Liaison** with major national mapping agencies – OSGB, Military Survey, UKHO.
- **Software Production Manager** with responsibility for turning high-tech spatial software developments into robust, timely products for customers. This involved ensuring efficient production procedures, managing product release scheduling, and communicating release contents.
- **Business Development Manager** with responsibility for the Mapping and Charting market, and being an evangelist and presenter for the company's object-oriented mapping technology.
- **Project Leader** or **Project Manager** of many large and small projects (see full c.v.).
- **Chief Programmer** and **Software Architect** for the LAMPS suite of mapping, charting, and geodata software used by prestige customers such as Ordnance Survey, UK Hydrographic Office, the AA, No1 AIDU, George Philips, USGS, etc.
- **Programmer**: I joined the company in 1975, developing the world's first line-following automatic map digitising system.

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## Education:

- Cambridge University course of Part I "Natural Sciences" Tripos, which gave a wide scientific training, and Part II "Computer Science" Tripos, which gave an intensive overview of computing.
- Secondary education at Kimbolton School, Hunts, gaining 9 'O' levels and 3 'A' levels grade at A.

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## Publications:

Around 50 published papers (single and joint). A full list is at <http://pghardy.net/paul/papers/> with on-line copies of most papers. These include:

- "GIS Data Models for INSPIRE and ELF" (Hardy, Lucchi), Data Modelling and Model Driven Implementation of Data Distribution, Copenhagen, Denmark, January 2015.
- "Consistency and Quality of INSPIRE & ELF Data, using GIS Tools" (Hardy, Cary, Lucchi, Hinojosa), Workshop on Spatial Data and Map Quality, Valetta, Malta, January 2015.
- "GIS for 3D Object Generation, Modelling, and Exploitation" (Hardy, Lucchi), EuroSDR 3D workshop, Southampton, UK, November 2014. Also available are slides.
- "ArcGIS for INSPIRE" (Hardy), EuroGeographics KEN workshop on INSPIRE, Paris, Oct 2013.
- "Portrayal and Cartography" (Hardy, Field), Chapter 11 of Springer Handbook of GIS, Heidelberg, March 2012. Original available at available at [www.springerlink.com](http://www.springerlink.com).
- "Specifying Map Requirements for Automated Generalization of Topographic Data" (Stoter, Smaalen, Bakker, Hardy), The Cartographic Journal, October 2009
- "Topological Constraints, Actions and Reflexes For Generalization By Optimization" (Monnot, Hardy, Lee), International Cartographic Congress, Moscow, August 2007.

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## More Information:

- Telephone 01223 263232, or email [paul@paulhardy.net](mailto:paul@paulhardy.net).
- Background information is available at <http://pghardy.net/paul/>.
- A full c.v. is available at [http://pghardy.net/paul/pgh\\_cv4\\_full.html](http://pghardy.net/paul/pgh_cv4_full.html).
- Further information on consultancy services is available at <http://pghardy.net/hardysystems/>.

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