

BUILDING ON HYDROGRAPHIC DATA

HSA Systems

HSA Systems Pty Ltd was founded in Sydney Australia in 1991 as Hydrographic Sciences Australia, the founding shareholders being Brian O'Neil and Jon Dean and initial business the provision of hydrographic software and data services to the Royal Australian Navy Hydrographic Office (AHO).

Paper charts in Australia in the early 1990s were largely produced using a system known as AutoChart that had its origins in the Australian Army map-making system, AutoMap. HSA provided technical and user support for this system on site at the AHO offices in North Sydney until eventually developing and implementing replacement technologies in co-operation with the AHS in the mid-nineties. These technologies pioneered the approaches being implemented by major HOs today.

HSA's present business activities retain a strong focus on the hydrographic and marine sciences but address a much broader base of activities, including:

- paper and electronic chart compilation, conversion and maintenance, both to IHO/IMO standards and purpose-produced charts for end-user applications
- navigation chart and topographic map distribution on a national scale
- chart production software systems and tools
- electronic navigation systems
- Mine Counter Measures (MCM) and other military applications
- Vessel Traffic Management Systems (VTMS).

HSA has been accredited to Quality standard ISO 9001 2000 since 1996.

The Company

HSA employs approximately fifty people, at three locations in Australia and New Zealand. With backgrounds in cartography, hydrography, surveying, software engineering and mathematics, many of these people have worked together since the inception of the company and have developed synergies between their areas of expertise and understanding of client requirements. HSA understands that the key to delivering successful solutions is working with clients on every aspect of development and delivery. These two key factors are the basis of HSA's long success in the challenging and ever-evolving hydrographic market.

Ownership Structure

HSA is owned by three shareholders, each of which holds a senior management role in the company. Brian O'Neil is managing director. Graham Field is manager of the IT Business Group and Phillip O'Neil manager of the Spatial Business Group.

Company Structure

HSA has a Corporate Services group and three, independent but co-operative Business Groups, delivering client and product services. The IT Business Group based in North Sydney delivers corporate HQ and IT services. The Spatial Business Group in Wollongong has nautical chart production, a Raster Data Centre and hydrographic spatial services. The New Zealand Business Group based at Wellington is responsible for the NZ Map and Chart Warehouse, Hydrographic Survey, nautical chart production, and NZMariner RNC encryption and distribution and navigation products.

Spatial Business Group

The Spatial Business Group is tasked as follows:

- management and operation of the Raster Data Centre, responsible for the maintenance and production of the entire RAN AUS paper chart series and associated digital products Seafarer RNC (Charts and Updates), Seafarer GeoTIFF and Print On Demand. This facility has been in operation for more than seven years, has a growing portfolio of more than 450 charts and is operated as an outsource contract for the RAN
- official Paper chart compilation, from source, meeting international standards (INT1, 2, 3) and distributed as charts legal for navigation by the RAN and Land Information New Zealand
- production of New Edition charts for RAN and LINZ
- conversion of Fathoms charts to Metric equivalents
- sounding capture from hand-written and computer-generated imperial and metric hardcopy fair sheets using HSA custom-built software
- S-57 ENC compilation, maintenance and production. HSA has its own S-57 ENC Producing Agency code and has created a large number of ENCs for national agencies and private clients. Indeed, as author of ENC Analyzer, HSA has intimate knowledge of all aspects of the ENC life cycle.

HSA is one of the few private companies worldwide that compiles “official” paper and electronic charts for hydrographic agencies.

New Zealand Business Group

HSA NZ specialises in the production of nautical paper and digital charts for Land Information New Zealand (LINZ), undertakes allied hydrographic activities including marine survey, and acts as the National Distributor for New Zealand topographic maps and nautical charts through the Map and Chart Warehouse. The NZ group has a strong navigation-products client base, from real-time docking-assist systems to AIS, VTS and onboard navigation systems. One unique project recently contracted to HSA by LINZ is confinement of zones of all LINZ survey sheets. This project will see New Zealand being the first country in the world to have complete Zone Of Confidence (ZOC) classification for its source material. This capability was developed entirely by HSA around HSA/SevenCs ENC Tools.

IT Business Group

The IT Business Group develops, maintains and supports a range of IT systems for other HSA business groups and a broad range of government, military and private clients. Various chart-production systems used by the HSA Spatial Business Group were developed by HSA specifically for the task, including the Raster Data Centre, Survey Conversion Suite and the ENC Tools suite (that includes ENC Analyzer (ENC validation) and ENC Cartographer (ENC to INT1). ENC Tools are collaboratively developed, sold and supported by HSA and SevenCs.

ENC Cartographer is a recent HSA breakthrough technology that generates official paper charts from ENCs using sophisticated rules and modelling algorithms. The resultant translation can be prepared for final printing using COTS packages such as Adobe Illustrator. This approach has many benefits, the major one being the use of a single source for both paper and ENC delivery. The technology may also form the basis of future print-on-demand deployment. Some example clients include the following.

The AMSA and MSQ Consortium

For the Australian Maritime Safety Authority (AMSA) and Maritime Safety Queensland (MSQ) consortium, HSA developed and continues to evolve and support ReefVTS, which is at the heart of the Ship Reporting System that tracks all large vessels travelling through the Torres Strait and Great Barrier Reef area. This area is too large to cover by conventional radar-based Vessel Traffic Systems, so the system implemented by HSA combines input from compulsory VHF radio reporting and an array of automatic positioning sensors, AIS, Inmarsat-C and radar deployed at strategic locations. The GBR ship-reporting system, in terms of area covered, is probably the largest VTS in the world. It is also unusual, in that regular reporting of passage through the VTS area is mandatory and also includes compulsory pilotage. This requirement is mandated by IMO regulation and reflects its world heritage listing. Since the initial installation, the REEFVTS has been regularly upgraded to meet new requirements. On 1st December 2004 the REEFVTS became an IMO classified Coastal VTS.

Australian Defence Industries

HSA has worked closely with the Australian Defence Industries (ADI, inter-nationally known as Thales) over many years in the development of what is arguably the most advanced range of Mine Counter Measure systems in the world. These were built around HSA’s own ECDIS software that provides a real-time GIS kernel for hosting sophisticated applications, including:

- VASCO II, a type-approved ECDIS system providing full sweep planning and operation
- MPSS (Mission Planning Support System), including Sweep Design, Sweep Effectiveness, Track Planning, Acoustic Generators Database and Reporting functions
- DMC (Remote Controlled Drone System) with real-time control of up to four, remote unmanned minesweepers.

ECDIS

Through its association with the AHO, HSA became involved in the long-evolving ECDIS technologies and standards. HSA prototyped and ran trials on ECDIS software and developed S-57 ENC charts of Sydney Harbour in the early 1990s. These were fun times that involved mobilising SUN workstations and large monitors onto vessels for sea trials and demonstrations using differential GPS. The long path to type approval has been both frustrating and expensive, and at times it felt like we had invented the telephone before electricity had been invented. Nevertheless, we persevered and now find our ECDIS technology forming the basis of many of our applications.

Future Directions

There are always business pressures on companies to expand into new areas. As highlighted on our website, HSA is passionate about the Hydrographic Sciences. We recognise our strong skills in this broad technology sector and will continue to build on that base of expertise. This has led us into VTS, AIS, military applications and port management systems. At the heart of, and underpinning, these applications is hydrographic data, our core domain knowledge and spatial anchor. I also wish to make special mention of the mentoring provided by the Australian Hydrographic Office, whose long and patient support has been invaluable.