Over 40 years of creating maps.

Hema Maps

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Abstract

For over 40 years, Hema Maps has been a pioneer in cartographic innovation, providing travellers and off-road enthusiasts with accurate and reliable mapping solutions. Starting out distributing paper maps to evolving into developing GPS technology in the 1990s, Hema has continually adapted to advancements in mapping technologies and methodologies. This paper explores the company's evolution, highlighting key milestones in the field mapping, digital integration, and crowdsourced data collection.

Initially reliant on early handheld GPS devices and paper table data entry, Hema transitioned to surveying-grade equipment in the 2000s, improving mapping accuracy and efficiency. Currently, the company utilizes smartphone-based data collection and automated processing tools, allowing for high rate of validation and integration of new road and track information. By involving the public in mapping efforts, Hema has expanded its data coverage while streamlining internal workflows, ensuring the efficient production of both digital and print maps.

This study examines Hema's innovative approaches to overcoming resource limitations, enhancing cartographic workflows, and continuing the high-quality mapping standards. Furthermore, it considers the broader implications of Hema's methodologies, including their potential for global application. By analyzing the evolution of Hema Maps, this paper provides insight into the future of mapping in an increasingly digital and data-driven world.

Introduction

For over four decades, Hema Maps has been at the forefront of cartographic advancement, providing travellers, adventurers, and off-road enthusiasts with highly detailed and reliable maps. Founded in 1983, the company initially distributed and sold maps and marine charts. However, after purchasing their first 4WD in 1989 Henry and Margret Boegheim the founders of Hema, embarking on expeditions across the Simpson Desert, Gunbarrel Highway, and Cape York, Hema quickly realized the inadequate quality of existing maps for remote Australia. This sparked the production of detailed maps for Cape York, the Kimberley region, the Flinders Ranges, and the Top End.

With a core focus on exploring roads less travelled, Hema decided in 1996 to heavily invest in the latest GPS technology to enhance mapping accuracy. Despite the bulky and cumbersome nature of early GPS devices, the company pioneered real-time data verification in the field, setting new standards for accuracy in both paper and digital mapping. This innovation cemented Hema's reputation as Australia's

premier provider of off-road and adventure mapping, blending field-tested reliability with technological advancement.

As the technology advanced, Hema Maps evolved from traditional paper-based cartography to integrating GPS technology, mobile applications, and stand-alone navigation systems. Through extensive field research and development alongside real-world data collection, Hema has maintained a reputation for accuracy and usability, ensuring that travellers have access to the most up-to-date and precise mapping resources.

This paper examines the history and evolution of Hema Maps, highlighting key milestones in its development and its contributions to modern mapping. As well as exploring the company's Ability to adapt to the ever-evolving technological advancements, the role of field mapping in ensuring accuracy, and the impact of its products on adventure tourism and off-road navigation. By exploring Hema Maps' legacy, we uncover the evolution of cartography over the past 40 years and glimpse the future of mapping in a rapidly advancing digital world.

In the early days, data collection relied on a handheld GPS paired with physical paper records for data entry. As technology advanced, the process transitioned to digital spreadsheets, facilitated by the introduction of laptops and other simple technologies such as more compact GPS devices. The cartographic methods applied at the time used with the available programs and resources.

As GPS technology advanced in the 2000s, surveying-grade equipment became the primary tool for digitally logging points and line data, a methodology still used today in cadastral surveying for site surveys and plan drafting. However, this form of technology required lengthy data input, with manual processing further extending the workflow. Despite these hurdles, maintaining high accuracy remained a priority and ensuring a more efficient cartographic process. This accuracy minimized manual adjustments in Illustrator during preliminary drafting, where scale, labelling, and colour schemes were set before final proofing, printing, and georeferencing for integration into our digital map app.

The latest generation of data collection at Hema Maps focuses on data completeness. Given the limited size and resources of the internal mapping team, a program initiative was created to involve the public in mapping and validating roads and tracks across Australia. This approach allowed widespread data collection beyond what was possible through internal mapping teams alone.

Utilizing modern smartphones or tablets equipped with an app supporting this initiative is very straightforward. A standardized template is in place to guide data collection, to ensure consistency in the information gathered. By leveraging ESRI’s suite of tools such as Field Maps (ArcGIS Field Maps , 2025), Quick Capture (ArcGIS QuickCapture, 2025) and Experience (ArcGIS Experience Builder, 2025) coupled with satellite data capabilities onboard the mapping vehicle, allowing real-time data

submission, Hema Maps significantly streamlined the data collection process. These tools significantly reduced the time needed for data entry in the field, allowing for greater coverage of remote areas where fuel and water are not as readily available.

Back in the office, greater efficiencies are achieved by using FME (FME by Safe Software, 2025), which automated data processing with minimal manual analysis. This ensured that the latest information is being integrated into Hema Maps' evolving cartographic workflows in map publisher, enhancing the overall accuracy and timeliness of mapping updates.

Over the past 40 years, advancements in technology and mapping processes have significantly improved data collection capabilities. However, limitations in human resources, such as insufficient teams and equipment, restricted efficiency. Extended trip durations and frequent team rotations were necessary to prevent burnout, yet data capture rates remained below Hema's expectations.

The shift to a crowdsourced mapping approach addressed these challenges by expanding coverage across multiple regions of Australia simultaneously, this program is called the Alpa Team. This not only reduced costs but also significantly increased data collection. Additionally, significant improvements in both data analytics and cartographic processes streamlined the overall workflow, reducing the time required for project completion from months to weeks.

This innovation has not only enhanced the accuracy but the efficiency of Hema's mapping operations as well. The ability to rapidly validate and integrate new data ensures that both digital and print products maintain high-quality standards while ensuring cost-effectiveness. These changes demonstrates that a combination of technological innovation, crowdsourcing, and automated processing has created a more sustainable approach to mapping in remote and challenging environments.

The continuous evolution of mapping technologies and data collection processes has allowed for a greater focus on data completeness, particularly in remote regions. The scalability of this program means that Hema can work toward a comprehensive update of Australia's unsealed road network, benefiting both public and private users through print products, digital navigation systems, and customized mapping solutions.

Furthermore, the development and refinement of a template for large-scale data collection presents opportunities for international applications. By applying this proven methodology outside Australia, Hema has the potential to expand its reach globally, offering high-quality mapping solutions to international markets and industries. This scalability reinforces Hema's position as a leader in innovative cartographic processes while ensuring continued advancements in data accuracy and accessibility.

Conclusion

Over the past four decades, Hema Maps has continuously evolved to meet the growing demands of travellers, off-road explorers, and mapping professionals. From its early reliance on paper maps and handheld GPS devices to the adoption of surveying-grade technology and, more recently, crowdsourced data collection, Hema has consistently prioritized accuracy, efficiency, and innovation. By integrating modern digital tools, such as smartphone-based mapping applications and automated data processing, the company has significantly improved both the speed and quality of its cartographic outputs.

The shift to a scalable, community-driven mapping approach has allowed Hema to overcome traditional resource limitations, expanding its data coverage across Australia's most remote regions. This transformation has not only enhanced the precision of its mapping products but has also set new standards for sustainable and cost-effective cartographic workflows.

As mapping technology continues to evolve, Hema Maps remains at the forefront of innovation, exploring opportunities for further automation, real-time data integration, and global applications of its methodologies. By leveraging these advancements, Hema is well-positioned to continue providing high-quality mapping solutions that support navigation, exploration, and adventure tourism in an increasingly digital world.

References

ArcGIS Experience Builder. (2025, January 31). Retrieved from Esri. (n.d.). ArcGIS Experience Builder: Build immersive web apps your way.: https://www.esri.com/en-us/arcgis/products/arcgis-experience-builder/overview

ArcGIS Field Maps . (2025, January 31). Retrieved from Esri. (n.d.). ArcGIS Field Maps: The all-in-one app for mobile work.: https://www.esri.com/en-us/arcgis/products/arcgis-field-maps/overview

ArcGIS QuickCapture. (2025, January 31). Retrieved from Esri. (n.d.). ArcGIS QuickCapture: The fastest and easiest GIS data collection app.: https://www.esri.com/en-us/arcgis/products/arcgis-quickcapture/overview

FME by Safe Software. (2025, January 31). Retrieved from Safe Software. (n.d.)FME br Safe Software - The All-Data Platform: https://fme.safe.com/

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