Automating photogrammetry analysis for orthophoto maps

National Center for Cartography | *Romania*

Industry

- Government & Public Sector

Solutions

- Octave Alto Enterprise, Octave Alto Data Management, Octave Imagine, Octave Alto Server

Challenges

- Substantial map data
- Inconsistent othophoto map quality
- Difficulty sharing maps

Results

- Automated data management system
- Reduced manual processes 97%
- Reduced data processing / validation time 80%

Romania's National Center for Cartography (CNC) is the cornerstone of the country's cartographic and land management infrastructure. Its primary role is to provide specialized technical support for developing and maintaining Romania's national geodetic and cartographic databases. This work is fundamental for the effective functioning of the National Agency for Cadastre and Land Registration (ANCPI) and its territorial offices. The CNC plays a pivotal role in a project aimed at creating high-quality, true orthophoto maps, DTM, DSM and a 3D mesh of each of Romania's 320 cities.

This data is vital in systematic cadastral registration, verifying cadastral documentation and facilitating advanced urban planning.

The project maintains strict standards for data quality and has many complex requirements, but the CNC's process was mostly manual, time-consuming and prone to errors. The CNC needed a new solution and turned to Octave partner Intergraph Computer Services (ICS) Romania, which created the Integrated Cartography Data Management System, built on multiple Octave technologies.

Managing industry-specific needs

The Center also struggled to overcome limitations on legacy technology when the project required state-of-the-art equipment and software. For example, in Bucharest, images were captured with nadiral and oblique photogrammetric cameras at 5 cm resolution, while for other localities, nadiral photogrammetric cameras were used.

The CNC required a solution with advanced technological capabilities, the ability to adhere to strict aerial photogrammetry environmental constraints and rigorous quality assurance standards across each geographical area. It also wanted to work with a vendor with industry-specific expertise and integrate geospatial data and software platforms from multiple sources.

"We sought to establish an integrated information system to seamlessly automate the reception, management and storage of photogrammetric data from at least 150 cities out of 320 for stage one of the project," said National Center of Cartography Director Ileana Spiroiu. "We also wanted the

system to have automated mechanisms to uphold stringent technical parameters, and it had to be scalable for future data collection and processing tasks."

Maximizing efficiency and accuracy

To achieve this, ICS Romania delivered a solution built on Octave Alto Enterprise (formerly M.App Enterprise), Octave Alto Data Management (formerly ERDAS APOLLO), Octave Imagine (formerly ERDAS IMAGINE) and Octave Alto Server (formerly LuciadFusion): the Integrated Cartography Data Management System.

The new system has a centralized shared workspace, which enables photogrammetry data providers to submit and validate data quickly and efficiently. The CNC can collaborate with these providers, who can upload everything from preliminary flight plans to final true orthophoto maps. The CNC then processes and authenticates the data using Octave spatial models and customized data collection and processing tools. The automation of these processes streamlines data reception and ensures accuracy and reliability. The process of producing a comprehensive verification report is 90% automated.

The simplified validation process leads to shorter approval times for photogrammetric blocks, and this faster process facilitates quicker decision-making and implementation, ultimately reducing project timelines. And, by centralizing data submission and validation, the CNC has realized a reduction in redundancies and errors, leading to lower operational costs.

Overall, the CNC reduced manual processes by 97% and has seen an 80% reduction in the time required to process and validate photogrammetric data submitted by imagery providers.

"Introducing the automated system has radically changed our processing of photogrammetric data," said Spiroiu. "Previously, processing photogrammetric data over large areas was challenging. With the new system, we automated processing of an area of over 5,012 square kilometers and manage data volumes over 2.5 petabytes."

Looking forward

Efficiencies gained through the system implementation have accelerated project completion and freed up resources that can now be used to deploy personnel and financial investments more appropriately. Additionally, the system's ability to generate 3D dynamic data through standardized data processing methodology enhances its value proposition because these data sets can be used and shared with other organizations.

The system was built with a commitment to open standards and interoperability, which will make it easier to maintain and update in the future. Now that the CNC knows it can meet the expectations for the project's first stage, it can use the system for future photogrammetric campaigns because it was built to evolve.

"Since we have the Integrated Cartography Data Management System, we will use it to address more complex cartographic data acquisition campaigns that were difficult with our manual workflows," said Spiroiu. "We plan to use it to give even more value to services provided to our customers and maybe even create new ones in the future."