

From Aerial Camera Manufacturing to 3D Mapping



Facing a huge challenge after the sale of its aerial camera-manufacturing business and the end of its largest contract, Belgium-based CICADE decided to focus on oblique aerial photography and 3D city modelling.

Pierre Louis founded CICADE in 1985. For over 15 years, CICADE followed the normal path of aerial survey companies, reaching a significant milestone in 1994

with a contract to aerially map the whole Walloon region (over 17,000km²) at a scale of Oblique and vertical images (GSD 5cm) of Cherbourg, France, captured 1:1000.

in July 2011; visualisation with Oblivision viewer.

The last decade saw the 'digital

revolution' bring fundamental changes to the whole sector, but especially to CICADE. Indeed, Pierre Louis never forgot the lesson learned when the arrival of digital workstations wiped out his investment in photogrammetric workstations that had "cost the price of a row of houses". Hence, when the time came to invest in a digital aerial camera, he chose to build one himself.

In 2004, the first digital aerial camera manufactured by CICADE was successfully tested. Due to the superior image quality, Pierre Louis decided to patent-protect his technology and proceeded to market the cameras. In 2006, the camera-manufacturing business was incorporated under the name of DiMAC and the cameras started to sell.

The period 2010-2011 was pivotal. In 2010, because marketing a camera requires a global network, CICADE sold DiMAC to Canada-based

The CS-15000, the new large-format

Optech, the world leader in laser scanners. Shortly afterwards, CICADE's 18-year contract with the Walloon region (accounting for over one third of company revenues) came to an end. "It was a formidable challenge to identify the development opportunities and most promising technologies on which to refocus the strategy of the company," reflects Pierre Louis.

camera from Optech.

It was first decided to broaden the company's international reach. With the help of a new Business Development executive, it took just two years for CICADE to transform from doing most of its business in Belgium and France to generating 90% of its revenues outside of Belgium.

Secondly, CICADE placed the DiMAC oblique camera – which was based on innovative technology for simultaneous image capture and which had not been part of the DiMAC sale to Optech – at the heart of its strategy. The company embarked on an investment programme to transform the high-quality images into valuable information for its customers, which has resulted in CICADE now being able to offer the following applications: the use of oblique images for texturing 3D city models; the delivery of the oblique images with a viewer allowing 3D visualisation of any object in the area of interest and various measurements; stereo mapping directly into oblique images acquired with enough overlap (for instance for LOD3 building modelling).

Finally, the potential offered by the oblique images to texture 3D buildings and the availability of highly experienced photogrammetry operators led CICADE to develop the production of 3D city models where a highly detailed (LOD2) rendering of the roofs and superstructures is required.

Besides these newly developed markets, CICADE continues to offer its services in its traditional markets: orthophoto production and cartography of urban areas, obstacle surveys of airports, corridor mapping for infrastructure operators (utilities, transport) or low-resolution photographic flights for the management and control of agricultural subsidies, etc.

CICADE is located at Charleroi Airport, where offices and hangar share a building to the side of the runway. The company's two aircraft based there will be soon joined by a third. Survey equipment includes two large-format DiMAC cameras and the DiMAC oblique camera; the new CS15000 camera by DiMAC (rebranded Optech) should be received in early 2013. Optech laser scanners are also available for Lidar missions. Together with its sister companies Aeroscan France, located in Nancy, and Aeroscan Luxembourg, CICADE employs 18 people and has maintained a consolidated turnover of between EUR2 million and EUR3 million. Growth perspectives are excellent and

The DiMAC oblique, a six-camera

CICADE's management is confident of passing the EUR4 million mark in the next 3 years.

system for the simultaneous capture of vertical and oblique views. CICADE's commercial philosophy stands on three pillars: one-stop shopping, customised solutions and technological partnerships. The offer of a vertically integrated solution – from the survey flight to the delivery of maps, 3D models or simulation results – by a single contractor meets client expectations since it allows them to concentrate on their core business or mission. Indeed, they avoid multiple tender and QC procedures. CICADE decided to offer fully customised solutions rather than one-size-fits-all products: the investigation of its clients' constraints, needs and applications will reveal which technology is the most appropriate. This approach allows CICADE to handle 'non-mainstream' projects and to occupy various market niches.

Such flexibility is only possible thanks to strategic partnerships with carefully selected providers of the key technologies needed. One example is the use of the DiMAC camera, a modular system which can be equipped with interchangeable lenses whose focal length range from 35mm to 210mm. While the 120mm camera will be preferred for city surveys since it reduces the leaning effect of buildings, shorter focal lengths are more suitable for height accuracy or for surveying large territories at low resolution. The use of a very short or very long focal length also enables CICADE to survey areas around busy airports where flight restrictions dictate very low or very high altitudes.

CICADE's flexible approach was also applied to the area of 3D city modelling where clients' budgets and requirements vary, calling for the use of different technologies: photogrammetry-based 3D modelling of buildings, a labour-intensive technology delivering unrivalled results even in the case of very dense historical town centres; automatic reconnaissance of buildings' roof lines based on a photogrammetry- or Lidar-based DSM and cadastral information; procedural generation of simplified 3D buildings on the basis of building footprints and height information; fully automatic generation of a photo-realistic 3D city or landscape model – in the form of a texturised TIN – based on the dense-matching technology using highly overlapping vertical (or vertical and oblique) imagery, etc.

CICADE reached its decision to develop in the area of oblique photography and 3D modelling after analysing the market trends at that time, and it continues to do so today. The company is also closely monitoring the developments in dense-matching technology. CICADE has already tested it for the production of DSMs and DTMs and it seems obvious that, in many cases, a DEM based on dense-matching will be a valid alternative to a Lidar-based one since it is more dense, combines the point cloud with the image information (while using a single sensor) and offers comparable accuracy (except for terrains covered with high vegetation). The company is particularly interested in the technology's potential for the production of true orthophotos (zero leaning effect).

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