Model helicopter photogrammetry: A flexible device for on-line data collection and processing

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Abstract

Executing a standard aerial photoflight is sometimes expensive or even very difficult, both from a navigational and from a weather point of view. Also, a shortcoming of standard surveying aircrafts is their limited maneuverability. As an alternative, model helicopters are becoming very popular lately. They are very flexible, both in terms of navigation and image taken modi and, mostly, higly cost-efficient.

The model helicopter gives us the best performance in terms of choosing variable image viewing directions, the best possible image scale and the best weather adaptation, producing an optimal image quality.

Our model helicopter is based on the industrial helicopter *Copter-1B* produced by *SurveyCopter*, France, which has a size of about 2.5 m and a weight of ca 40 kg. The integrated *wePilot1000* flight control system, developed by the company *weControl*, is and adapted to the helicopter. It allows flights to be either fully controlled by the operator or operating in an autonomous, preprogrammed mode, being controlled via a standard notebook computer. The model helicopter includes a digital camera for picture taking and a video camera for on-line checking of position and orientation. The ground control station consists of a laptop with the *weGCS* ground control station software for the status information and waypoint navigation as well as the aircraft control unit for the independent control of the model helicopter and the camera. For safety reasons start and landing is always controlled by a pilot, who uses a joystick for maneuvering.

We have used this helicopter already successfully to record and model an Inka settlement in Pinchango, Peru.

We will discribe the procedures and results of this project. Beyond that we will discuss the further possibilities that come with such a system. In particular we will focus on the issue of on-line processing.