

IGI

Integrated Geospatial Innovations

Philipp Grimm, Kreuztal

ABSTRACT

IGI is one of the world's leading geospatial companies and conducts business worldwide. IGI's success is driven by the employees and their commitment to get results the right way – by operating responsibly, executing with excellence, applying innovative technologies and capturing new opportunities for the best possible accuracy. For more than 35 years, IGI is active in the field of aerial survey, developing guidance and sensor management systems as well as precise positioning and attitude determination systems. Since 15 years, special developments for clients resulted in airborne laser and digital camera systems. The focus at this Photogrammetric Week is on new sensor solutions and their positive outcome for the operator.

1. INTRODUCTION

Effective since April 2015 Christian and Philipp Grimm are the new Chief Executive Officers of IGI. They will continue the work of Hubert Minten who joined IGI as CEO in 2008.

"We are delighted to take care about this additional responsibility" commented the Grimm brothers. To guide the company into the new age, the Grimm brothers introduce a new company slogan: **IGI – Integrated Geospatial Innovations**.

2. SENSOR EVOLUTION

IGI remains committed to developing world class sensor solutions for the professional geospatial market. Now a look will be taken to the sensors IGI has developed since the last Photogrammetric Week in 2013.

2.1. IGI *Quattro-DigiCAM* with 20.550 x 14.700 pixel resolution and NIR option

After introduction of a single *DigiCAM* together with an airborne laser scanner in the year 2000, IGI introduced in 2008 the 235 Mpix *Quattro-DigiCAM*, modular large format digital aerial camera. The new 300 Mpix camera model of 2015, now supports FMC – Forward Motion Compensation and an optional NIR channel. The new IGI *Quattro-DigiCAM-300* is based on 4x *DigiCAM-80* models; therefore single *DigiCAM-80* systems can be upgraded to a large format aerial camera. With the new footprint, aerial survey companies will save flying time and money.



Figure 1: IGI *Quattro-DigiCAM*.

IGI Quattro-DigiCAM-300

- Increased in Swath width to 20.550
- FMC by TDI
- Channels: RGB + NIR
- Pixel Size: 5.2 μ m
- High Frame Rate 1.5 sec
- Lens: 110mm, 150mm
- High Dynamic Range >72db
- Integrated Sensor Management (*IGIvisu*)
- Integrated GNSS/IMU system (*AEROcontrol*)
- Integrated Mission Planning & Flight Guidance system (*CCNS-5* with *IGIplan*)

2.2. IGI *Quattro-DigiCAM-Oblique* Aerial Camera System

The IGI *Quattro-DigiCAM-Oblique* is another housing for the *Quattro-DigiCAM-300* system which offers the opportunity to use **one** aerial camera system for two purposes: the collection of nadir & oblique imagery.



Figure 2: IGI *Quattro-DigiCAM-Oblique* & IGI *Penta-DigiCAM*.

IGI Quattro-DigiCAM-Oblique* & *IGI Penta-DigiCAM

- 80 Mpix Nadir (Penta) with FMC
- 4x 80 Mpix Oblique (Penta & Quattro), 45°
- Pixel Size: 5.2 μ m
- High Frame Rate 1.5 sec
- High Dynamic Range >72db
- Integrated Sensor Management (*IGIvisu*)
- Integrated GNSS/IMU system (*AEROcontrol*)
- Integrated Mission Planning & Flight Guidance system (*CCNS-5* with *IGIplan*)

2.3. IGI *Penta-DigiCAM* Oblique Aerial Camera System

By using 5x *DigiCAM* systems the IGI *Penta-DigiCAM* features 80 megapixel nadir view with FMC and 45° oblique views to all sides. The integrated *IGIvisu* sensor management gives the operator a clean system view whether it is a Quattro, Quattro-Oblique or Penta arrangement.

2.4. Conversion of an IGI *Quattro-DigiCAM* to an IGI *Penta-DigiCAM*

Using up to five *DigiCAM* camera systems a *Quattro-DigiCAM* camera system can be converted into a *Penta-DigiCAM* camera. Figure 3 shows the conversion process which can be done by the operator himself within 2-3 hours. This smart solution gives the opportunity to use one camera system as large format and nadir + oblique aerial camera system.



Figure 3: Conversion of an IGI *Penta-DigiCAM* to an IGI *Quattro-DigiCAM*.

2.5. Expanded Workflow – Innovative Solutions

Providing world-class sensors at an unrivalled price is not enough. The workflow and processing software is important as well. IGI provides software for camera calibration, dense point matching and automatic true orthophoto generation to complete the aerial camera systems in the geospatial workflow to a turn-key solution.

IGImatch is a Photogrammetric Imagery Processing Software which uses all kind of oriented imagery for the dense image matching algorithm. The workflow is fully automatic and *IGImatch* provides automatic DSM & True Orthophoto generation, automatic dense pointcloud generation with Smart Filter. Figure 4 show the optimal results the software delivers by using IGI *Penta-DigiCAM* imagery.

IGImatch – 3D Nadir

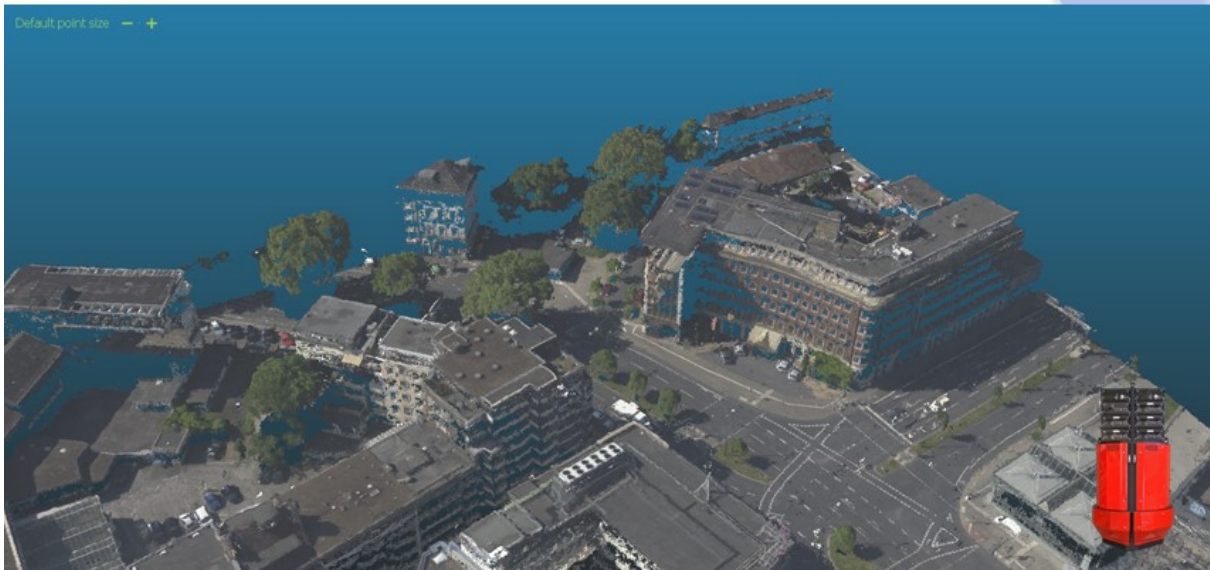


Figure 4: IGImatch 3D Nadir View.

IGImatch – 3D Nadir & Oblique



Figure 5: IGImatch 3D Nadir & Oblique View.

For Figure 4 only nadir imagery was processed and house façades have information lacks, using nadir & oblique imagery the house façades are clear and clean.

To process the imagery in time *IGImatch* supports multiple CPU core and GPU processing.

3. CAVALON AERIAL SURVEY

At INTERGEO 2012 IGI introduced a gyrocopter for aerial surveys. Gyrocopters have been invented in the year 1923. Due to their design, they are particularly good for aerial surveys and there are easier regulations than with RPAS/UAVs. A gyrocopter can carry standard survey equipment and with the use of a *CCNS-5* even untrained pilots can carry out aerial survey missions in a short time.



Figure 6: IGI *CAVALON Aerial Survey* during a survey flight (camera & laser).

In 2013, IGI introduced the *CAVALON Aerial Survey* which today is used by several companies to conduct aerial photography missions (2cm GSD) and laser scanning surveys for example for rail-way or insurance companies. Prof. Fritsch from Stuttgart University stated “our expectations were exceeded. Since standard software for aerial triangulation is used, it requires, no expensive preprocessing by special algorithms as for RPAS systems.” The IGI *CAVALON Aerial Survey* is an “ideal platform for photogrammetry on demand”, he continued. The quality of the images is excellent. Further advantages are that a gyroplane is cost-efficient in

operation, cheap to run, can easily be transported in a trailer which can be used as well as hangar. Not least because of this positive experience, IGI has continued the developments in this field and is proud to announce the possibility of a combined *LiteMapper* (airborne laser) and *DigiCAM* system where the camera is inside of a stabilized mount. The standard sensor configuration suites for photogrammetry, airborne laser scanning and 3D city modelling are available as well.

4. OUTLOOK

The geospatial technology is moving rapidly and will become more important to different market segments. Photogrammetric Week is an excellent place to network and to reflect what has been accomplished in the last two years.

The IGI team would like to thank Prof. Fritsch for his hospitality and organisation of the past Photogrammetric Weeks. He made it possible that IGI could participate at this event as Open PhoWo Partner. He also led the Photogrammetric Week to an international accepted and popular event. All the best for the future!

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