



### The price of system including software and automatic stabilized platform

Price for system is around **\$380000**, including camera with software, stabilized platform, control computer, installation and training. The price *does not include* a GPS/IMU system.

### Camera features and technical specifications

Leaflet <http://www.geosystema.net/Brochure/DAS.pdf>

Presentation <http://www.geosystema.net/Brochure/DAS.ppt>

### Software

*DASControl/DASRectify* software supplied with the camera is used for calibration, scanning and image rectification. Rectified images are georeferenced and can be used for stereo mapping and orthophotos mosaiking with Geosystem “*Delta/Digitals*” software (<http://www.vingeo.com/podelta.html>).

### Image processing workflow and used software

- 1) Create flight mission plan (layout) using *Digitals FMS* software.
- 2) *DASControl* software is used to scan ground surface during the flight mission. Camera switch on and off automatically by *Digitals FMS* flight management system as well as real-time navigation for pilot. *Third party system (like PosTrack from Applanix POTrack AV) can be used as an alternative.*
- 3) When flight is finished, GPS/IMU native software is used for measurements adjustment (together with ground stations measurements).
- 4) *DASRectify* software automatically rectifies raw (Level0) images by IMU/GPS data. Created rectified Level1 images are georeferenced and corrected by aircraft attitude and position. These images have parallel-perspective projection and can be processed on any specially adopted photogrammetric software.
- 5) Using *Delta/Digitals* photogrammetric software an operator performs stereo data capture (map compilation), automatic/semiautomatic DEM creation and ortho rectification and mosaic.

*Image workflow diagram* <http://www.geosystema.net/Brochure/DASWorkflow.pdf>

### Which GPS/IMU can be used with the camera?

The camera was tested with the following GPS/IMU systems:

- 1) Applanix POS AV 510 [http://www.applanix.com/products/posav\\_index.php](http://www.applanix.com/products/posav_index.php)  
Price range is around \$250000, delivery time 1-3 months (depends on country and require export permission from US Department of State if used with LN200 sensor).
- 2) IGI CCNS/AEROcontrol <http://www.igi-systems.com/products/aerocontrol.htm>  
Price range is around \$250000, delivery time 1-2 months.
- 3) Novatel SPAN <http://www.novatel.com/products/span.htm>  
Price range is around \$100000, delivery time 1-2 months.
- 4) Leica IPAS10 [http://www.leica-geosystems.com/corporate/en/ndef/lgs\\_62633.htm](http://www.leica-geosystems.com/corporate/en/ndef/lgs_62633.htm)

### Is flight management system included?

Camera can be supplied with its own flight managements system *Digitals FMS*

### Is stabilized platform included?

Camera can be supplied with automatic stabilized platform (ASP-1) or it can be used with existing Leica PAV30 platform

## Which aircraft can be used to fly with the camera?

The system was tested/used with Cessna, Turbo Commander, Porter Pilatus, Antonov-2.



Turbo Commander



Porter Pilatus



Antonov-2



Cesna

## Camera components and connection diagram

[http://www.geosystema.net/DAS/3DAS1\\_Technical\\_manual\\_v3-en.pdf](http://www.geosystema.net/DAS/3DAS1_Technical_manual_v3-en.pdf)

## Exploitation mode

Temperature inside aircraft must be at least + 5 °C.

Pressurized aircraft must be used for flights higher than 3000 meters (sea level) to avoid hard disks damage.

## Sample project processing with timings

Approximate time schedule for 1:2000 scale orthophotos flight for 50-100 sq.km. town  
GSD - 10.8 cm, flight scale 12000, swath width 864 m

- 1) Flight mission planning using vector or scanned map 1:25000-1:100000 – 1 hour.
- 2) Flight mission – 2-4 hours.
- 3) Raw data copying (100-200 Gb, 10-20 strips) from camera RAID-array to office server – 1-2 hours
- 4) GPS measurements processing with ground stations data in PosPack or GrafNav – 1 hour.
- 5) Rectification. In average one modern PC (Intel CoreDuo 2 – 2Ghz/RAM 2048Mb) can rectify 40Gb raw data for 12 hours. Rectification is usually takes one night on several computers (3-4 strips on each PC). Rectified images are usually created with JPEG compression (quality 95-97%) and all channels are automatically clipped by triple overlay zone.
- 6) Creating DEM or TIN by semiautomatic correlation or stereo measurements – 2-3 days
- 7) Orthorectification of strips (nadir channel) – 12-24 hours
- 8) Generating and editing cutlines – 2-3 hours.
- 9) Automatic radiometric correction (color balancing) for visible seam removing – 12-24 hours.
- 10) Cutting final mosaic on map sheets with inserting frames, grids, legend, etc – 2-4 hours.

## Who is developer and manufacturing of the system?

The system was developed and tested in cooperation by Geosystem (Ukraine) and Wehrli and Associates (USA) during 2001-2004 years. Serial production started in early 2005. Manufacturer is Geosystem. There are customers using this system in USA, Mexico, Ukraine, etc.

## Recommended flight height and speed for different flight scales/ground resolutions

<http://www.geosystema.net/Brochure/DAS.pdf>

## Required GPS ground stations.

Depending on flight area, 1-4 ground stations are required (with at least 0.5 sec registration interval) providing maximum 60 km distance from aircraft to nearest station.

## Rectified images samples (nadir channel)

[Ground sample distance 7 cm \(flight scale 1:8000\)](#)

[Ground sample distance 11 cm \(flight scale 1:12000\)](#)

[Ground sample distance 23 cm \(flight scale 1:25000\)](#)

For fast view and create pyramids use DIPEdit program:

<http://www.vingeo.com/update/bin/DIPEdit.exe>

## Stereoscopic samples

<http://www.geosystema.net/DAS/01-N.tif>

<http://www.geosystema.net/DAS/01-F.tif>

<http://www.geosystema.net/DAS/01-B.tif>

Use *Delta/Digitals* software <http://www.vingeo.com/update/bin/Ged.exe>  
to run stereo with shutters, anaglyph or stereoscope (split screen) mode

Orthophoto (scale 1:2000, pixel 0.15 m)

<http://www.geosystema.net/DAS/2000.tif>

## How many operators handle the camera?

One camera-man

### **Minimum configuration of computers for image processing**

Intel CoreDuo 2 – 2Ghz/RAM 2048Mb

### **Which media is used for data storage?**

Camera control computer has two removable RAIDs of 2Tb each, that can be connected to any PC equipped with UltraWide SCSI 320 interface.

### **Data transfer rate**

Approximately 100Gb can be copied from RAID to PC per one hour