

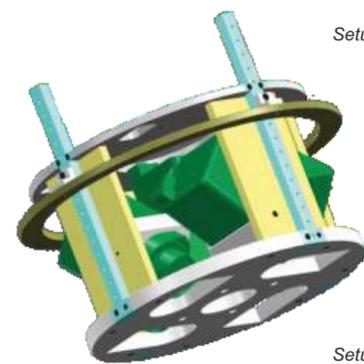
OIS - Oblique Imaging System

GGS has already integrated Phase One technology into a Oblique Imaging Systems and has clients successfully operating the system. With the wide range of sensors, lenses and offset angles we provide 2 standard products, the IOS XL using 5 iXU-RS 1000 with 70mm and the IOS XXL using 7 iXU-RS 1000. We also manufacture by user request, e.g. with 9 Camera heads of different angles, sensors and layouts.

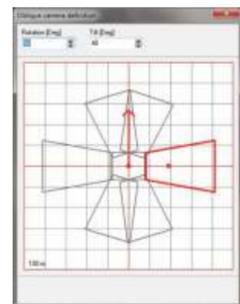
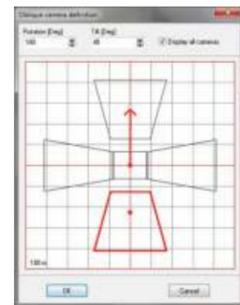
The cameras are mounted extreme closely with respect of low vignetting by the camera hatch. All components are designed for high accuracy mapping. The camera tilt angles can be modified between 30 and 45 degree in 2.5 degree steps. The complete system will be delivered calibrated with respect of single camera calibration, relative offset-angles between the cameras, calibration of the nodal-point shift between the IMU and the cameras as well as the boreside angles of the GNSS-INS system.

We offer by the end of this year the AeroStab-XL mount that is able to host also the setup with 7 cameras. Our AeroTopoL FMS has special tools to plan multicamera surveys and combined with our AeroDiDOS GNSS-INS, you get directly referenced data for a smooth workflow.

What you get is a high accurate and most stabile mapping system to generate 3D City models with an outstanding precision .



Setup of the OIS XL 5



Setup of the OIS XL 7

3D view of the calibration area of Speyer



4-Band Solution

With the increasing demand for combined NIR and RGB aerial imagery for applications such as crop analysis for growth optimization, vegetation health and environmental contamination as well as projects including city observation for green site monitoring, Phase One has developed a fully automatic solution for capturing and processing 4-Band imagery*, using two high-resolution Phase One aerial cameras, specifically designed for the photogrammetric airborne market. The 4 -Band solution includes two synchronized Phase One metric calibrated cameras (RGB and NIR) mounted side by side on a AeroStab Gyromount, an iX Controller computer and the iX Capture software.

The software automatically generates distortion-free images and performs fine co-registration of pixels from the NIR to the RGB images, including processing different image sizes. This fully automatic process is supported by Phase One's iX Capture software, ensuring these 4-Band images offer a precise output data you can rely on when combined NIR and RGB aerial images are the only solution for your project.

iX Capture outputs the following products:

- 4-Band combined NIR and RGB (RGBN) TIFF (4-Band CIR)
- 3-Band combined NIR and RGB (NRG) TIFF (3-Band CIR)
- NDVI (Normalized Difference Vegetation Index) TIFF
- Distortion-free / corrected RGB TIFF
- Distortion-free / corrected NIR TIFF
- RGB TIFF
- NIR TIFF



AeroCam

Aerial Mapping Solutions based on Phase One Technology



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GGGS develops and integrates aerial surveying systems for more than 14 years. Since more than 10 years we integrate in our various mapping systems the Phase One technology. Our family of gyro stabilized mounts (AeroStab) are the perfect basis to accommodate the Phase One Cameras, stabilize the rotations of the aircraft fast, precisely, trigger the camera and generate a precise orientation for the images. Our Flight Management System AeroTopoL is a perfect partner for planning and navigation of aerial missions. We also support technology for direct referencing (AeroDiDOS) that can be nicely combined with our stabilizers to achieve the best stabilization and enable the best post-processing accuracy using the floating lever-arms. Combining several camera-heads helped clients in wide area mapping (AeroCam Tri) for wide corridor mapping or as a twin-setup for monitoring purposes. The new 4-band solution can be nicely hosted on our AeroStab-M. Doing more e.g. 3D City-modelling, we designed out high technology OIS (Oblique Imaging System) that can accommodate 5, 7 or 9 Camera-heads. Our new AeroStab-XL is the biggest stabilizer on the market and is specially designed for the OIS.

Making more, we also combine different sensors e.g. RGB and Thermal Sensors or Hyperspectral with RGB cameras and of course also Lidar.

Whatever you need, we would like to be your partner!

iXU 1000

The 100 MP Phase One iXU 1000 is the flagship product in the range of medium format aerial cameras, presenting exceptional performance and advanced capabilities. Equipped with CMOS sensor technology and an innovative electromagnetic central leaf shutter, the iXU 1000 provides enhanced capture rate and speed with zero latency, ensuring the precise image quality expected from a dedicated aerial photography camera.

The Phase One iXU aerial cameras include features such as: accurate metric calibration, central leaf shutters, scalability to form multi-camera arrays, as well as easy integration into the GGS portfolio. The iXU-RS cameras are built with one of seven lenses. The interchangeable lenses are individually inspected and factory calibrated for infinity focus. The range of focal lengths cover most uses and is suitable for creating DTMs and DSMs for surveying as well as Orthophotos. The CMOS technology of the iXU 1000 enables you to move from ISO 50 all the way up to 6400, providing quality images all across the ISO range. As weather conditions deteriorate or on days when you previously were unable to capture, the CMOS-based cameras provide the high sensitivities that can make a difference.

Flying with an iXU 1000 enables users more coverage during a flight, while maintaining the same ground sample distance (GSD), or a lower GSD, while flying at the same height. The small form factor make it an ideal camera for use as a standalone camera for photogrammetric work or as part of an array of multiple cameras, either to cover a larger swath or as part of an oblique camera system.

	Ø 1 Å1 ĆĆĆ	iXU 1000	iXU-RS 180	iXU 180	iXU-RS 160	iXU 160	iXU-RS 160 A	iXU 160 A	iXU 150	
	100 MP	100 MP	80 MP	80 MP	60.5 MP	60.5 MP	60 MP	60 MP	50 MP	
Resolution	11.608 x 8.708	11.608 x 8.708	10.328 x 7.760	10.328 x 7.760	8.984 x 6.732	8.984 x 6.732	8.964 x 6.716	8.964 x 6.716	8.280 x 6.208	
Pixel size	4.6 µm	4.6 µm	5.2 µm	5.2 µm	6.0 µm	6.0 µm	6.0 µm	6.0 µm	5.3 µm	
Sensor size	53.4 x 40.0 mm	53.4 x 40.0 mm	53.7 x 40.4 mm	53.7 x 40.4 mm	53.9 x 40.4 mm	43.8 x 32.9 mm				
Iso range	50-6400	50-6400	35-800	35-800	50-800	50-800	200-3200	200-3200	100-6400	
Shutter Speed	1/2500 s	1/1600 s	1/1600 s							
Shutter control			1/3 increments							
FMC Option	N/A	N/A	TDI	TDI	TDI	TDI	TDI	TDI	N/A	
Capture rate	0.6 s	0.6 s	1.25 s	1.25 s	1.1 s	1.1 s	1.1 s	1.1 s	0.85 s	
File size IIQ I	100 MB	100 MB	80 MB	80 MB	60 MB	60 MB	60 MB	60 MB	50 MB	
File size IIQ s	65 MB	65 MB	54 MB	54 MB	40 MB	40 MB	40 MB	40 MB	33 MB	
Weight			930 g							750 g

iXU 180, 160, 160 Achromatic and 150

With a choice of models, the iXU CCD-based aerial cameras are designed to easily incorporate into existing or new systems, making it the perfect solution for integrators or end users looking for a rugged, high-quality industrial-grade aerial camera system. The medium format solution offers exceptional image quality and features that rival large format cameras at a fraction of the price. The range of focal lengths cover most uses and is suitable for creating DTMs and DSMs for surveying as well as Orthophotos. 80 MP, 60 MP and 60 MP achromatic CCD versions for users looking for a standalone camera or an array of multiple cameras. The iXU 150 hosts a 50 MP CMOS chip.

Forward Motion Compensation

The Phase One forward motion compensation (FMC) solution employs Time Delayed Integration (TDI) to compensate for image blurring occurring as a result of slower shutter speeds, faster flight speeds or higher GSDs. This enables more flexibility when determining flight schedules and enhanced image quality under low light conditions. The FMC option enables increased profitability through the ability to fly more days and under less optimal light conditions, compensating for issues with blurring and smearing. The Phase One FMC feature is sold either as an option on a new system or as an upgrade to an existing camera. It is available on the 80 MP and 60 MP CCD Sensors.

iX Controller

Phase One offers a choice of hardware and software solutions to enable the integration of the camera with GGS components. Designed to provide the ultimate in speed, and with the ability to control up to six Phase One aerial cameras, the iX Controller is a rugged, fanless PC, based on the 4th Generation Intel® Core™ i7 Processor. With a small footprint and easily integrated into any aircraft, the Phase One iX Controller acts as a central hub of your aerial camera system controlling multiple cameras. The iX Controller employs two removable SSD drives, which have especially high write speeds to ensure you capture and record every image quickly and reliably. When the mission is over, the compact and light SSD drives are easily removed from the iX Controller and sent for processing.



iX Controller

Phase One RS Shutter

The new RS Lens shutter was designed especially for the tough demands of aerial imaging. It uses an innovative direct drive concept with electronic charging that enhances exposure speed as fast as 1/2500s, guaranteeing half a million exposures. The blades in the RS shutter are produced of specially made carbon fiber material, as used in the aerospace industry, driven by a linear motor and controlled in real time for absolute precision of exposure time. The reliance of the RS shutter's capacity of 500,000 cycles along with the exposure time of 1/2500s enables faster flying, and allows customers to execute and manage the most demanding aerial photography missions with higher operational efficiency, reliability, and in a cost effective manner.

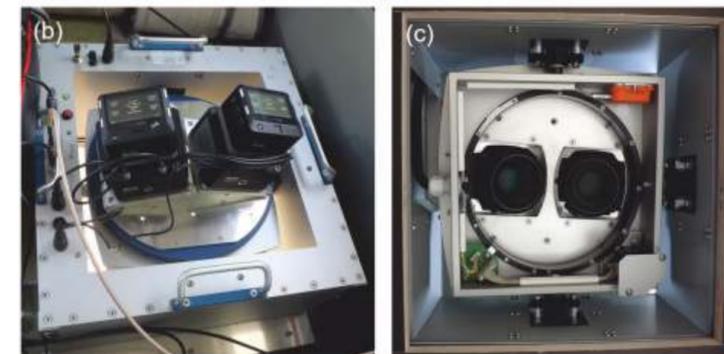


The innovative RS Shutter

Ø T Å N Ö C C E	Shutter Speed	Lens Type	Weight
32 mm f/4.0	1/2500	Rodenstock	790 g
40 mm f/4.0	1/2500	Rodenstock	730 g
50 mm f/4.0	1/2500	Rodenstock	800 g
70 mm f/5.6	1/2500	Rodenstock	580 g
90 mm f/5.6	1/2000	Rodenstock	1150 g
110 mm f/4.0	1/2500	Schneider-Kreuznach	620 g
150 mm f/5.6	1/2500	Schneider-Kreuznach	630 g
iXU Lenses			
55 mm f/2.8	1/1600	Schneider-Kreuznach	630 g
80 mm f/2.8	1/1600	Schneider-Kreuznach	480 g
110 mm f/2.8	1/1600	Schneider-Kreuznach	635 g
150 mm f/3.5	1/1600	Schneider-Kreuznach	650 g
240 mm f/4.5	1/1000	Schneider-Kreuznach	1600 g

Twin, Triple and Multisensor Setups

The Phase One iXU architecture is ideal for combining several units for special applications. A setup using 2 iXA 180 cameras for seabird monitoring give a 400 m view cross track @ 2 cm GSD. Combined with a NIR Sensor for glare compensation, this system enables automated data processing for identifying single species. The system is hosted on an AeroStab-M in combination with AeroTopoL FMS.



(a) Equipping a twin-engine aircraft for aerial digital surveys of marine wildlife,
 (b) View of a crosswise mounted tandem camera (iXA180) on AeroStab-M,
 (c) Exterior view of the camera system through the hatch of the aircraft



Camera-iX Controller triple for wide corridor mapping

Wide corridor mapping is supported by either 3 iXA180 with 150 mm lens and 20% overlap between the sensors which results in 26.800 pixels cross track. Using the same setup with the new iXU-1000, we can generate a cross track width of 30.200 pixels, one of the widest mapping setups available.

We also combine various sensors e.g. RGB and ThIR for environmental surveys and are flexible to develop a solution for your tasks.



RGB and Thermal imaging for environmental surveys

