Developments in digital airborne imagery interfacing

Peter Hollebeek, Bio/consult, Denmark

- Company profile
- Digital camera equipment
- GPS-system
- Case studies
- Products

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Company profile

Bio/consult is a biological consultancy company established in 1980 and currently numbers over 30 employees.

The company provides international consultancy and advisory services in connection with monitoring of marine, freshwater and land areas and resources.

We provide environmental impact assessment studies and statements, aerial photography, charting, monitoring, etc.

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Company profile

The Remote Sensing department offers environmental surveys for example mapping of marine and terrestrial vegetation, monitoring of waterfowl.



Our twin engine Partenavia P68 Observer was built in 1980. The aircraft was formerly used for oil spill surveillance. OY-SUR is equipped with various cameras and the Ashtech Airborne GPS-unit

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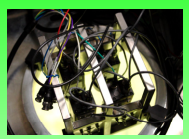
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Digital camera equipment

FICAF
Foulum Image CApture Facility



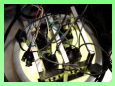
One-Shot Camera
Light Phase/H20



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Digital camera equipment

FICAF



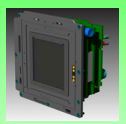


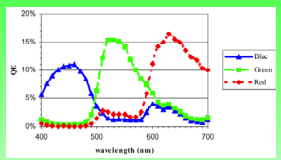
Ministry of Food, Agriculture and Fisheries
Danish Institute of Agricultural Sciences

Digital camera equipment

PhaseOne Single shot camera





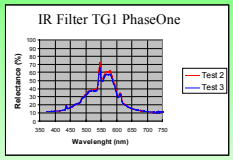


Typical Quantum Efficiency Curves

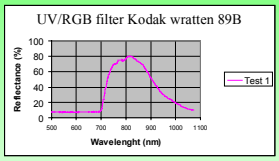
4080 x 4080 9 micron pixel CCD Color Image Sensor
Digital image 24 Bit 48 Mb
ISO range 50 or 100

Digital camera equipment

PhaseOne H20 Construction

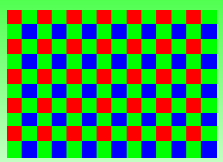


IR filter reflectance



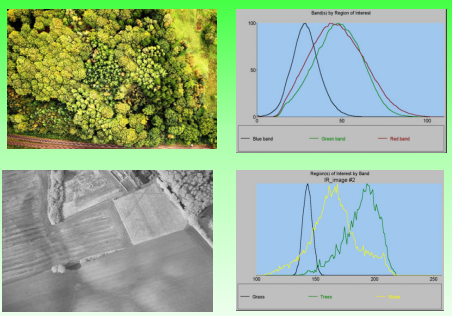
UV/RGB filter reflectance

Digital camera equipment



The Bayer Pattern

Digital camera equipment

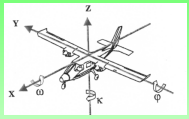


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GPS-system

The purpose of using GPS (Global Positioning Systems) with aerial photographing is to determine the position of the camera (X,Y,Z) and to determine the attitudes (heading, pitch and roll) of the camera at the moment of exposure.



We have implemented a four-antenna GPS-system to determine these unknowns

GPS-system

- Auto mosaic creation

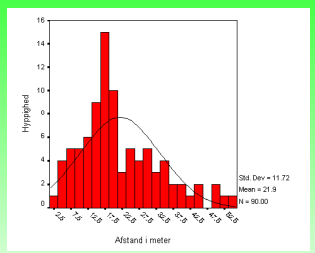
A special developed software module in Chips for windows makes it possible to automatically creating an orthophoto given a camera description file and a camera orientation file.

The module makes it possible to create automatic a mosaic covering large areas.

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GPS-system

- Error



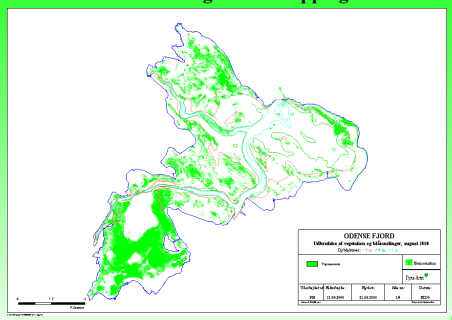
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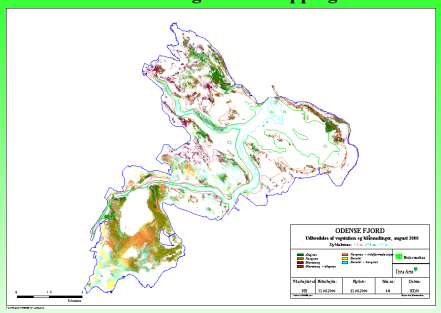
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Case 1 vegetation mapping



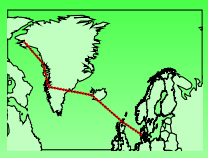
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Case 1 vegetation mapping



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Case 2 Aerial surveys of Narwhales august 2001









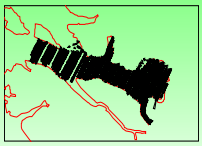
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Case 2 Aerial surveys of Narwhales august 2001

Population estimation of Narwhales using 2 digital cameras
550 survey km per transect
2 digital 13 MB images /4 seconds
12.000 images in total
310 Gigabyte data (incl. Backup)

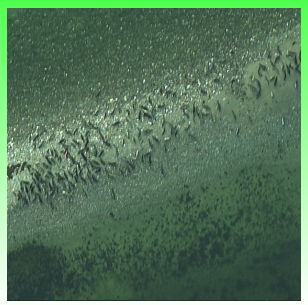






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Case 3 Counting Wildlife



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Products

- Imaging
- BioFlight
- FlightPlan

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Products

BioFlight
BioFlight is used for automating aerial photography. Using a list of predefined points, the camera is automatically activated when the plane passes each point. The planes position, pitch, roll and heading together with the image number is stored in a log file. This information is subsequently retrieved for automated geo-coding and mosaic creation of the images in Chips for Windows. BioFlight is a commercial product. In cooperation with the Chips for Windows extended license you will be able to automatically create mosaics without the use of Ground Control or Tie Points.



BioFlight seen from the operators view in the back of the plane



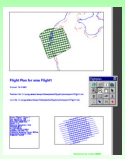
BioFlight seen from the pilots view in the front of the plane

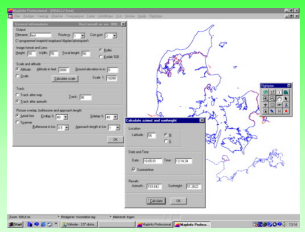
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Products

Flight Plan

Flight Plan is used to plan a photo flight using specific camera descriptions. FlightPlan is build as an MapInfo application.





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