

# UEF Drone Lab

## **oGIIR - *Open Geospatial Information Infrastructure for Research***

**Anton Kuzmin, Alfred Colpaert**

Finnish National Research Day in Geoinformatics 2018

3<sup>rd</sup> of May, Helsinki



UNIVERSITY OF  
EASTERN FINLAND

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- Drone knowledge center

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# UEF Geoinformatics Research Group

University of Eastern Finland (Joensuu Campus)

Department of Geographical and Historical Studies

Our research group focuses on better understanding and interpretation of human-nature interactions with the Earth's surface using the geodata.

Professors:

Alfred Colpaert, physical geography

Timo Kumpula, remote sensing, Land use and land cover change

Markku Tykyläinen, Geospatial analysis and statistics

Senior researchers: Eliisa Lotsari, Fluvial geomorphology

PhD students: 7

Website - <http://www.uef.fi/en/web/geoinformatics>

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## Platforms

- Fixed-wing UAVs



**eBee Plus RTK**

Flight time – 59 mins  
Speed up to 110 km/h  
Max. area coverage – 40 km<sup>2</sup>  
Multiple payload  
No GCPs needed



**Parrot Disco Pro AG**

Flight time – 45 mins  
Speed up to 80 km/h  
Sequoia camera  
FPV

# Platforms

- Multi-rotor UAVs



**DJI Matrice 210**

Flight time – up to 38 mins  
Payload – up to 2.3 kg  
Multiple payload  
Water resistant



**DJI Phantom 3/4 Pro**

Flight time – up to 30 mins  
4K 12/20 MP camera  
Thermal camera



**DJI Mavic Pro**

Flight time – up to 27 mins  
4K 12 Mp camera

# Sensors

- RGB and thermal sensors



**SODA**

1 inch 20MP  
F2.8-11 FOV 84°

eBee Plus RTK



**Zenmuse X4S**

1 inch 20MP  
F2.8-11 FOV 84°

Matrice 210



**Flir Vue Pro 640**

640 × 512  
Several lenses

Phantom 3 Pro



**Zenmuse XT**

640 × 512

Matrice 210

# Sensors

- Multispectral



**Parrot Sequoia** – 4 x 1.2 MP single band cameras (Green, Red, Red Edge, Near Infrared), 16 MP RGB camera, sunshine sensor for calibration, GPS.

eBee Plus RTK, Parrot Disco



**MicaSense Rededge** – 5 band camera (Blue, Green, Red, Red Edge, Near Infrared), GPS

Matrice 210

**Hyperspectral system (coming this year!)**

## Collaborations – National level

### Courses at UEF

- Northern environments: research methods

Annual offered UEF field course organized by the Department of Geographical and Historical Studies at the University of Eastern Finland/Jyväskylä in cooperation with the Leibniz University Hannover/Germany in Kilpisjärvi, Finnish Lapland. The aim is to detect the changes of the elements compared to the measurements of the previous years and to get a better understanding of ecosystem functions under subarctic influence

- Field course in Physical geography

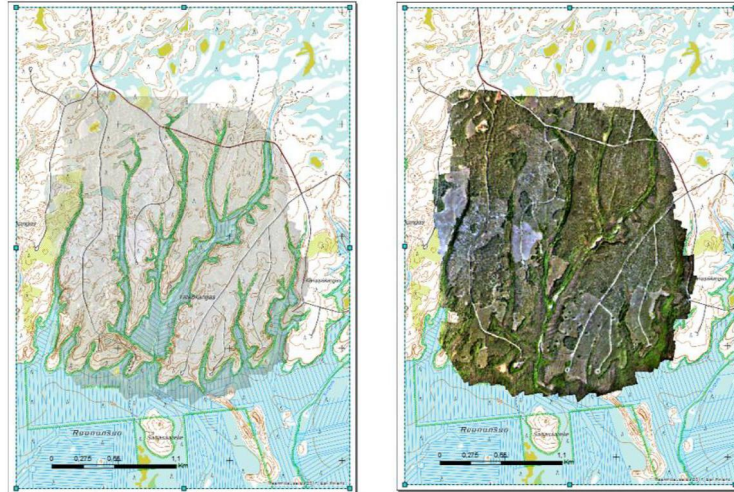
Field course for 1st year students of Geography



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## Collaborations – National level

Restoration project of ravines with ELY-keskus (Centre for Economic Development, Transport and the Environment)



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## Collaborations – National level

### University of Helsinki

The idea of joint study is to predict the total aboveground biomass (of vascular plants) based on the UAV 3D and multispectral data.

### University of Turku

The aim is to develop advanced field measurement methods and to determine the year-round, river dynamics in changing cold climate river environments.





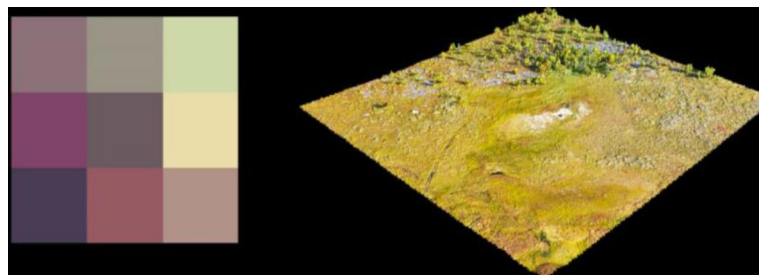
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## Collaborations – National level

### **“Integrated Biodiversity Conservation and Carbon Sequestration in the Changing Environment” (IBC-CARBON)**

Working package “Improved Earth Observation techniques”, where the key aims of are to collect cutting-edge EO data at various spatial and temporal scales; develop and produce novel remotely sensed indicators of biodiversity variables and variables for C-sequestration and forest radiation studies.

<http://www.ibccarbon.fi/fi-FI>



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## Collaborations – International level

### **University of Namibia (UNAM)**

Satellite based canopy cover/forest area mapping comparison with UAV data

Informal settlements study



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# Informal settlements study together with UNAM in Namibia

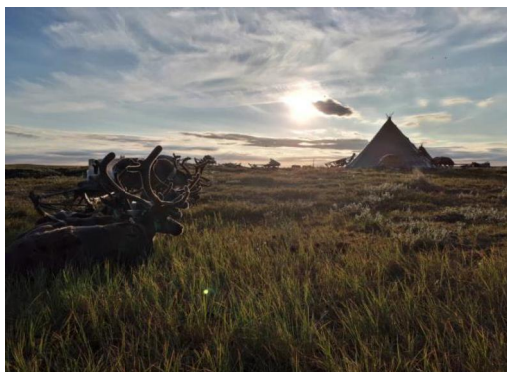


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## Collaborations – International level

- HUMANOR project

One of the main aim is investigation of decadal dynamics of tundra vegetation on cryogenic landslides of Yamal peninsula, capture spatially continuous, individual-level information about plant productivity and its context in the environment via both structural and spectral models, mapping of willows and tree height assessment.



<http://www.arcticcentre.org/EN/research/Projects-and-Research-Networks/Pages/HUMANOR>

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# UAV knowledge center

New courses, workshops, seminars to come (starting next year)

New collaborative projects

UAV training and support services

Data collection and analysis services

Data sharing platform

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## Thank you for you attention!



Would you like to know more? Visit: <http://www.uef.fi/en/web/geoinformatics>