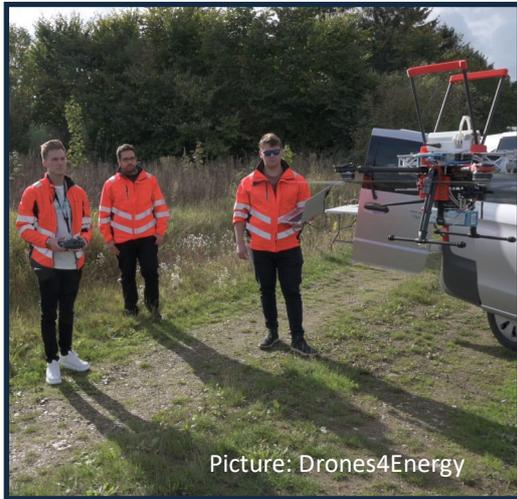




This issue - February 2021

- Greetings from the project leader
- News from the Development initiative at SDU
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- News from the Application initiative at Aarhus University, University of Copenhagen and Technical University of Denmark
- About the UAS Ability project



Picture: Drones4Energy

Dear Drone Community,

As we enter into the 5th and final year of the UAS-Ability project, it's great to see how far the initiatives have advanced and to recognize the number of drone projects supported by the infrastructure. Much of the research and education generated will help to sustain the infrastructure for many years into the future. Overall the drone community in Denmark is experiencing increased growth and maturity, creating new companies and jobs. The technology developed allows researchers to perceive and understand their environment in a manner that just a few years ago was unattainable or cost prohibitive. Further, an array of multi and hyperspectral, LiDAR, and magnetometer sensors provide additional data and insight of the world around us.



One measure of the project's success is the ability to sustain the infrastructure beyond the initial implementation period. In this regard, each project partner is pursuing future research, innovation, and education objectives utilizing the UAS-Ability infrastructure. This ensures the continued growth and success of the drone community in Denmark.

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-Best regards, Brad Beach

the Development initiative at SDU UAS

SDU UAS Test Center is an ecosystem for developing and testing drones and drone-related system platforms. Our hangar facility is located at Hans Christian Andersen Airport north of Odense.

SDU UAS Test Center offers companies, researchers, partners, and engineering students access to the state-of-the-art laboratories and test areas to create coherent and safe drone systems.

News from the Development initiative

Drones4Safety—Drones to inspect bridges and railroads in Europe



A major EU-project led by SDU will develop an automatic drone system to monitor bridges, railroads, and other critical infrastructure over the next three years. The drones will fly in swarms, photograph and analyze the constructions, harvest energy from power cables, and notify if repairs are needed.



Picture: AGAVE

Facilities at SDU UAS:

Composite Laboratory

The Composite Lab in the SDU UAS Test Center offers 300 square meters of lab space for composite production for drones, space systems, and for a variety of other purposes.

Systems Integration Laboratory

The systems integration lab is a multi-disciplinary research and workshop environment that focuses on integrating and testing the many different parts and subsystems that comprise a modern drone system. Its mission is to provide a flexible and well-equipped work environment for researchers and companies to come together to test and integrate coherent and safe drone systems.

Contact us **Development initiative**

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Drones4Safety has received a grant of 26 million DKK through the EU's Horizon 2020 program and it will run from June 2020-2023. The consortium led by SDU consists of 9 partners and represents the full value-chain for the development of an autonomous, self-charging, collaborative drone system for inspecting transport infrastructure. Read more about the project, [here](#).

U-Space Fyn - First U-Space in Scandinavia

Imagine a sky where drones and traditional airborne traffic safely fly side by side, and where the drones can fly beyond visual line of sight (BVLOS) of the drone pilot. This will soon become reality, when a new Danish collaboration establishes the first U-Space in Scandinavia in the skies above HCA Airport. In the future, the new U-Space will cover all of Denmark. The first test flights will take place this autumn and will be conducted by the innovation projects HealthDrone and SqMFarm. Read more about the new initiative, [here](#).

AGAVE—AI-based Geomodels from UAV Geoscanning

Today's geoscanning solutions are based on airborne scanning from helicopters. The purpose of the Eurostar project AGAVE is to further develop the solution to use drones. Integrating a high-resolution ground investigation workflow consisting of a geoscanning system carried by a UAV, machine-learning-based data integration and a drastically reduced invasive sampling program, will increase sustainability for the construction sector. Find out more about the new Eurostar project at SDU, [here](#).

New infrastructure added to UAS Test Center at HCAA

Zealand electricity grid owner and operator Cerius A/S made it possible for the UAS Test Center at HCAA to install two ten-meter transmission towers to help develop and test drones for infrastructure inspection and interaction. Suspended from the towers are three 50Kv power transmission lines with 500 amps of transmission current. This allows testing of the drone platforms in a harsh EMI environment. For more information, see [here](#).

SDU 



the Integration Initiative at AAU

The Drone Research Lab in Aalborg provides equipment for research purposes. The Lab has BVLOS capabilities and helicopter drones with a supporting GCS van. The Lab is capable of performing advanced tests at all locations where the GCS van can go.

Rotorcraft test platforms

Drone Research Lab has three available aircraft with rather different capabilities. The choice of platform depends on a range of parameters, including payload mass, flight distance, expected weather conditions, and airspace restrictions.

Mobile ground control station

The mobile ground control station is integrated into a Mercedes Sprinter Van. It transports the three aircraft as well as all necessary flight equipment and maintenance tools. It accommodates 4 people during flight operations.

News from the Integration initiative

Drone Research Lab has entered two new research projects that will continue the operations of the UAS-ability equipment at Aalborg University. The SuperTEM project is funded by The Innovation Foundation and focuses on the detection of water in the ground using a small antenna carried by an unmanned aircraft. The ADD2wind project is funded by EUDP and focuses on the delivery of larger payloads from shore to offshore wind turbines.



AALBORG UNIVERSITET

SuperTEM

SuperTEM is lead by Aarhus University, with Aalborg University, Aarhus Geosoft, Poul Due Jensen Fond, and Rambøll. The project will develop, implement, and demonstrate a miniaturized system for groundwater detection that fits onto a commercial drone.



Picture: SuperTEM

This system consists of an antenna located below the rotorcraft in a slung load, along with amplifier electronics and communication to the ground, fitted onto the aircraft fuselage. Also, a ground station for the sensor will be developed. The aircraft will fly the antenna very close to the ground in a controlled fashion. For this project, the HEF32 aircraft will be used, and demonstrations will occur both in Denmark and abroad. The image shows the other AAU aircraft carrying a slung load during an earlier test flight for slung load stability.

ADD2wind

ADD2wind is lead by Aalborg University. Its purpose is to demonstrate the concept of delivery of spare parts directly from shore to offshore wind turbines, often located more than 20 or 30 km from the coast. The project is primarily a demonstration project to show the feasibility of such air cargo deliveries.



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The aircraft will be a B330 from Aeroscout in Switzerland, which, as a partner, also will be operating the aircraft during flight operations.

The project will demonstrate BVLOS operations in Danish airspace and operations close to a spinning turbine. Further, actual deliveries will be demonstrated in various weather conditions to turbines at Anholt Windfarm in Kattegat, Horns Rev 3 in the North Sea, and Kriegers Flak in the Baltic sea. Both the manufacturers of the wind turbines, Siemens Gamesa, and MHI Vestas Offshore Wind, and the owners of the wind farms, Ørsted and Vattenfall, are partners in the project. Also, EMG developing transport containers for the offshore industry is a partner in the project, and Loxar is commercializing partner.

The project's progress will be shown with videos on the AAU [UAS-ability YouTube channel](#) and more detailed through the [LinkedIn profile of Loxar](#).

You can sign up at either place to get regular updates once the project starts on April 1, 2021.



Picture: ADD2Wind



the Application Initiative

Drone technology has many important applications. The Application Initiative at AU, KU and DTU focuses on various applications of drone-mounted sensors to answer fundamental research questions, to optimize workflows, and investigate new innovative ways of data collection.

Members of the Application Initiative can assist you to apply drone technology and associated sensors if your specific aim is to:

- Answer fundamental research questions within your field (e.g., biology, agrobiolgy, energy, environment, or climate)
- Increase quality or efficiency when mapping and monitoring (e.g., animals, vegetation, crops, pollutions, hydrology).

The Application initiative provides airborne data collection equipment (various drones and sensors) and insight on data collection and processing workflows that assures that you most efficiently get from your questions/aims to high quality data and results.



Picture: Bjarke Madsen digging up Arctic shrubs during field-work at Sisimiut, Greenland.

News from the Applications initiative—AU

The UAS Ability activities at Aarhus University cover several different institutes; the Institute of Biology, the Institute of Bioscience, the Institute of Agroecology and the Institute of Environmental Sciences.



Overall, the application initiative is progressing well at Aarhus University and we are creating interesting data using the drone infrastructure. Regarding equipment, we have invested in a new eBeeX from SenseFly with a full set of sensors (S.O.D.A. 3D, Duet-T, and RedEdge MX).

Drone ecology - Understanding grassland plant diversity dynamics using close-range remote sensing

The Application Initiative team at Aarhus University congratulates Bjarke Madsen, who successfully defended his PhD Thesis on Drone ecology.



Picture: Drone mapping and monitoring activities with YellowScan Surveyor LiDAR system at Mols Bjerger with yellow flowering of *Cytisus scoparius* (Eng: Scotch broom, DK: Gyvel).

During his PhD studies, Bjarke Madsen investigated fundamental components of grassland plant diversity by applying close-range remote sensing techniques. Plant diversity in the world's grasslands are changing due to human induced activities such as climate change, nutrient enrichment, and land-use change. Bjarke Madsen studied how close-range remote sensing observations can be used to monitor changes in plant diversity objectively and to increase spatial coverage, while maintaining an ultra-high level of detail.

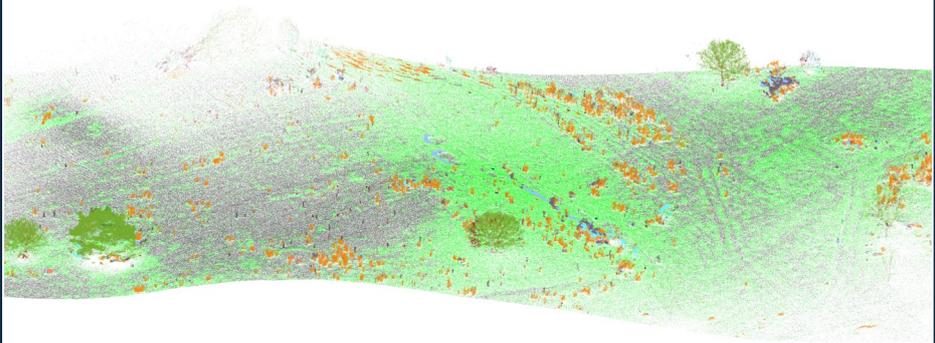


Picture: UAS LiDAR system used in re-wilded area of Mols Bjerger

The conducted research contributes to an increased understanding of plant diversity dynamics and highlights the potential application of drones for detecting environmental change across spatial scales.

The studies are particularly useful for modern day nature conservation and monitoring programs to achieve observations at an appropriate resolution and at larger extents, matching the scale of management activities.

For more information, [see here](#).



Picture: Drone-based LiDAR derived point cloud from a semi-natural grassland in Mols Bjerger National park classified into vegetation types and specific shrub species. Cytisus scoparius (Eng: Scotch broom, DK: Gyvel) are represented with orange points.

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About the UAS-Ability Project

UAS-Ability is a cooperation between major Danish universities to establish a Danish research infrastructure for development of drone technologies, integration and use of drones in research and data collection. The research infrastructure facilities can be rented by academic and commercial users upon application. UAS-ability is supported by the Danish Agency for Science, Technology and Innovation and partners.

For more information about UAS Ability and registrations for the future newsletter and events check the project home page, [here](#)

AAU

AU

SDU

DTU

KU