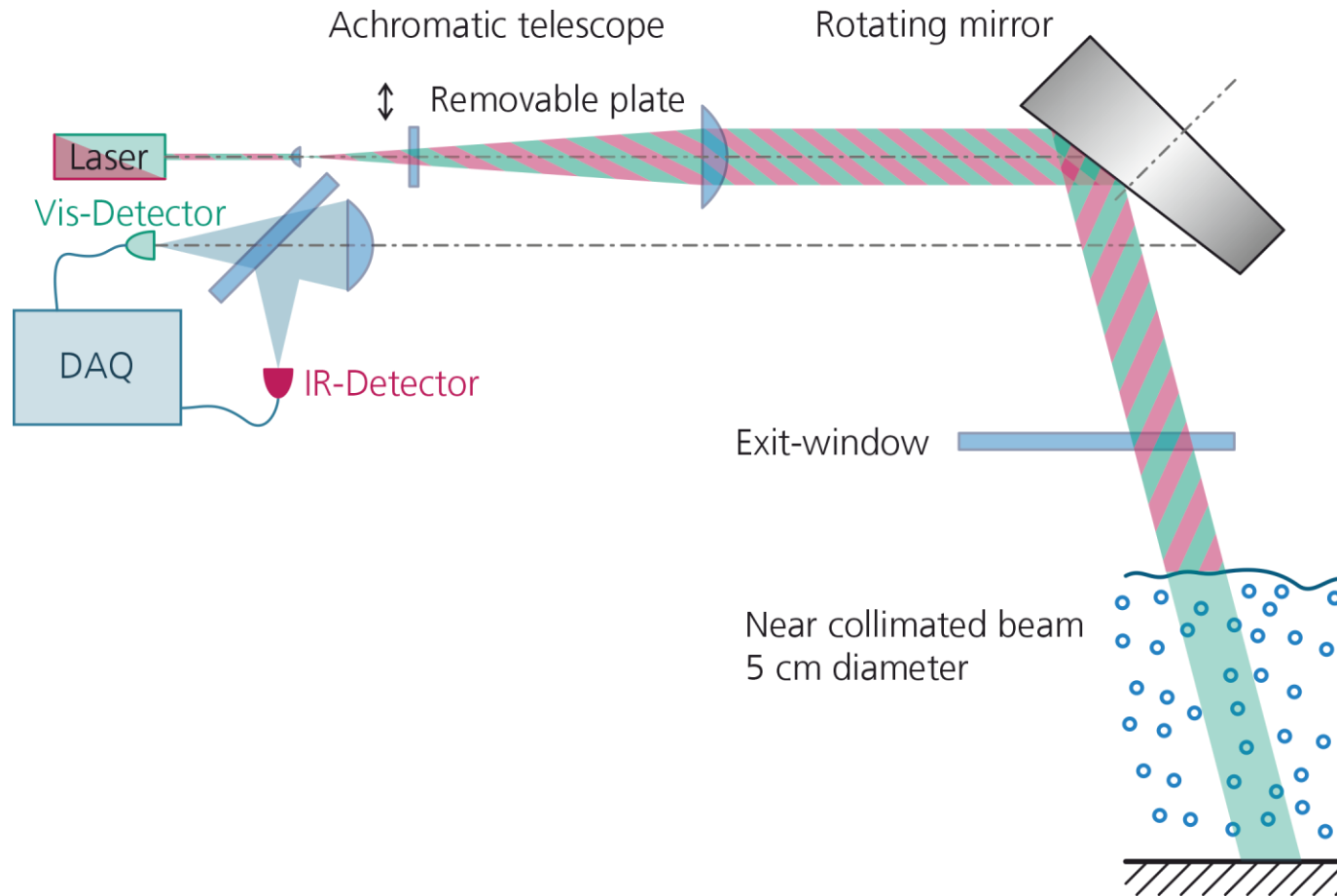


# UAV-Based High-Resolution Surveying of Shallow Waters with Collimated Dual-Wavelength Bathymetric LiDAR

—  
Jannis Gangelhoff, [Christoph Werner](#), Alexander Reiterer 09.07.2025  
3D Underwater Mapping from Above and Below

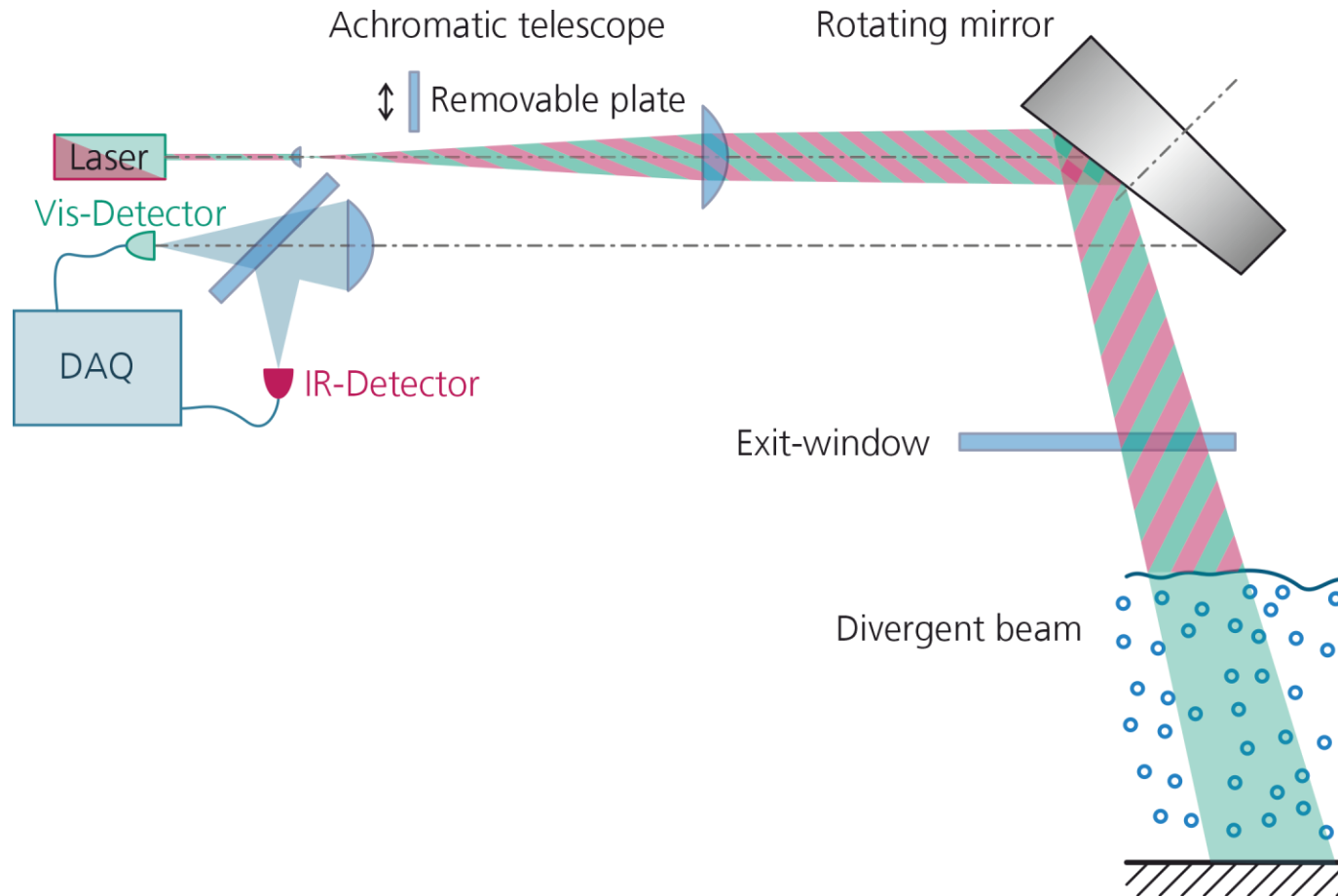
# System Overview

## Optical Design




# System Overview


## Optical Design



# System Overview

## Technical Specifications

 1064 nm + 532 nm (IR + green)  
simultaneous and coaxial

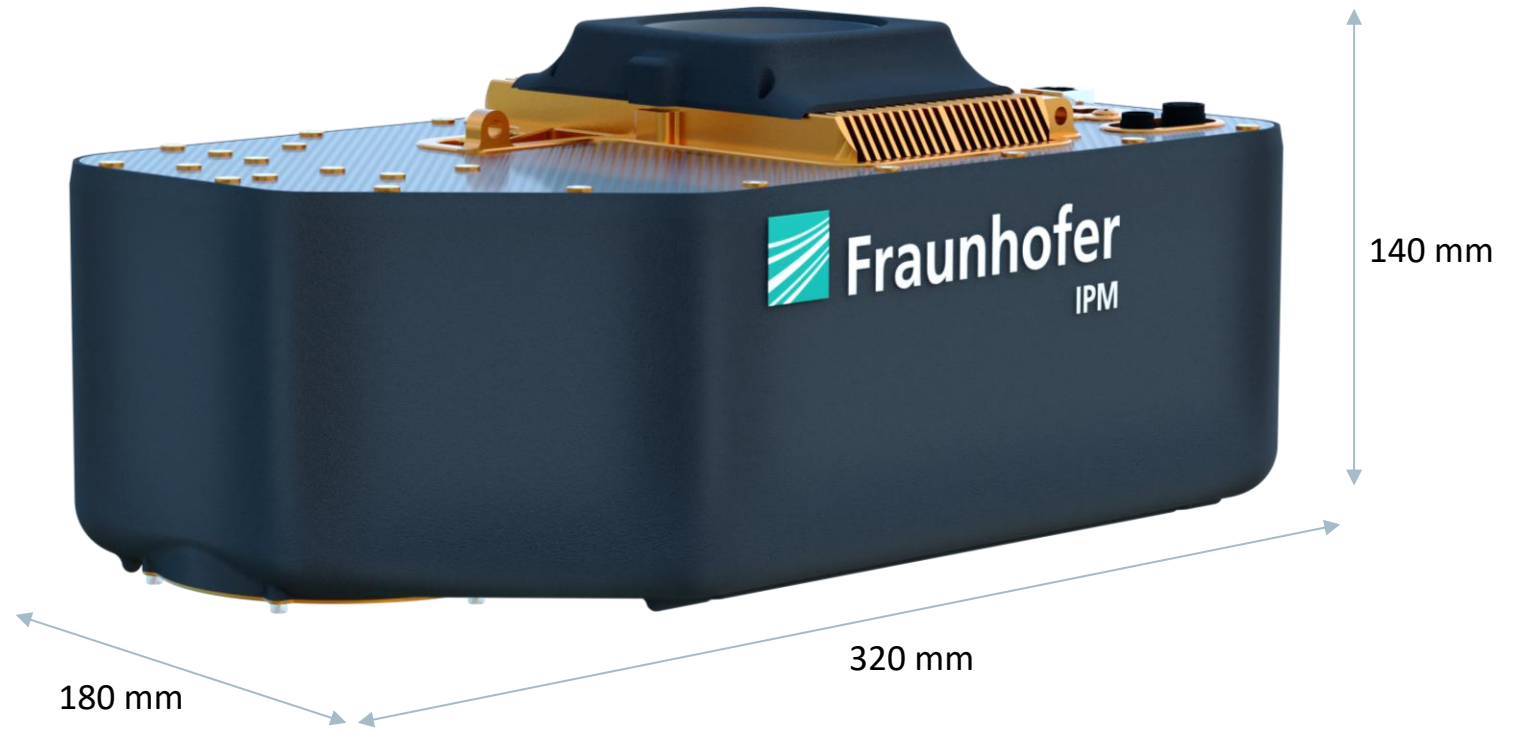
 35 000 Points per second

 5 GPS

 30° Palmer scanner

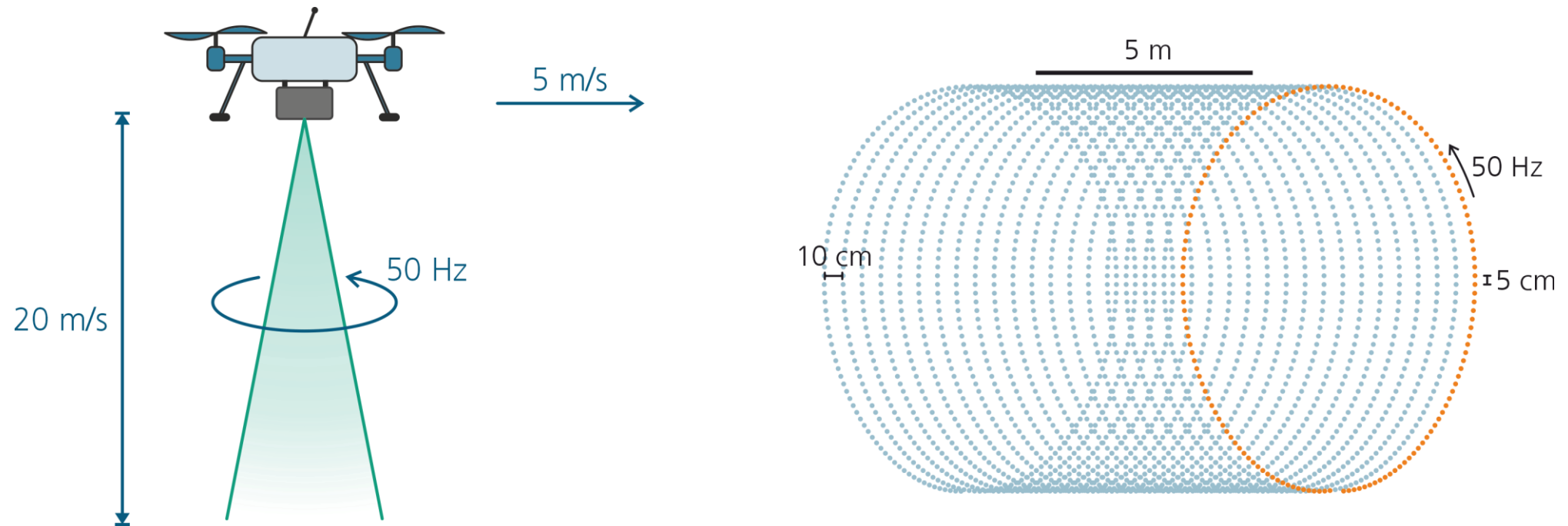
 2,5 kg

 Class 2M



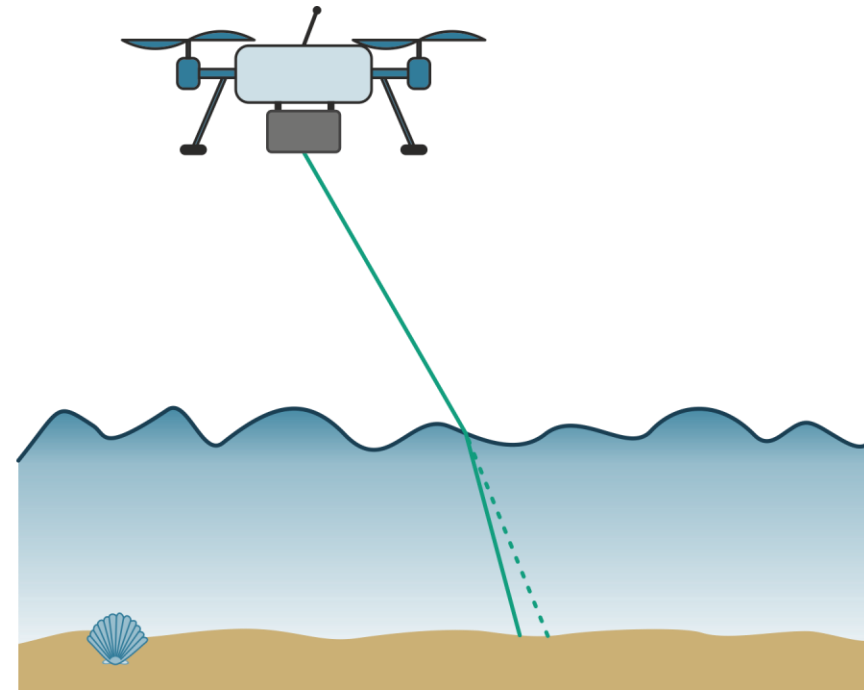
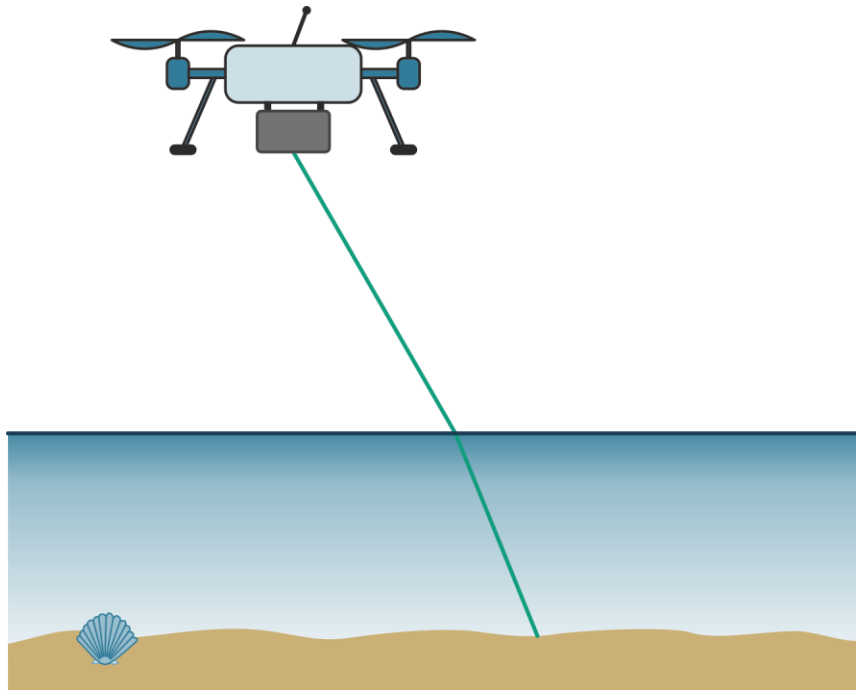
# High Resolution?

## Scan pattern



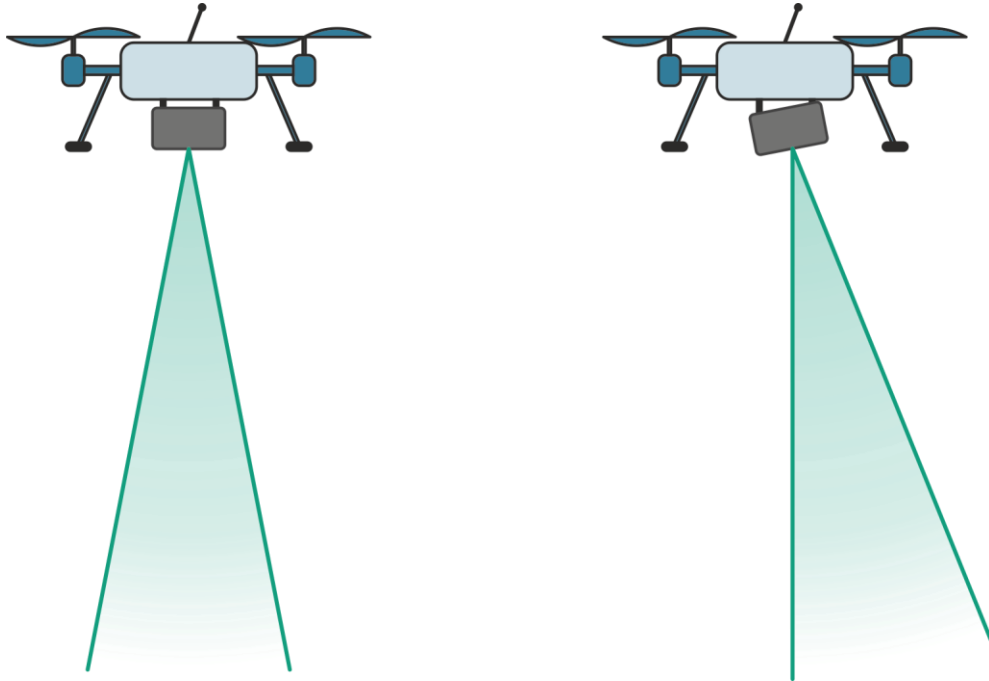
# High Resolution?

## Waves



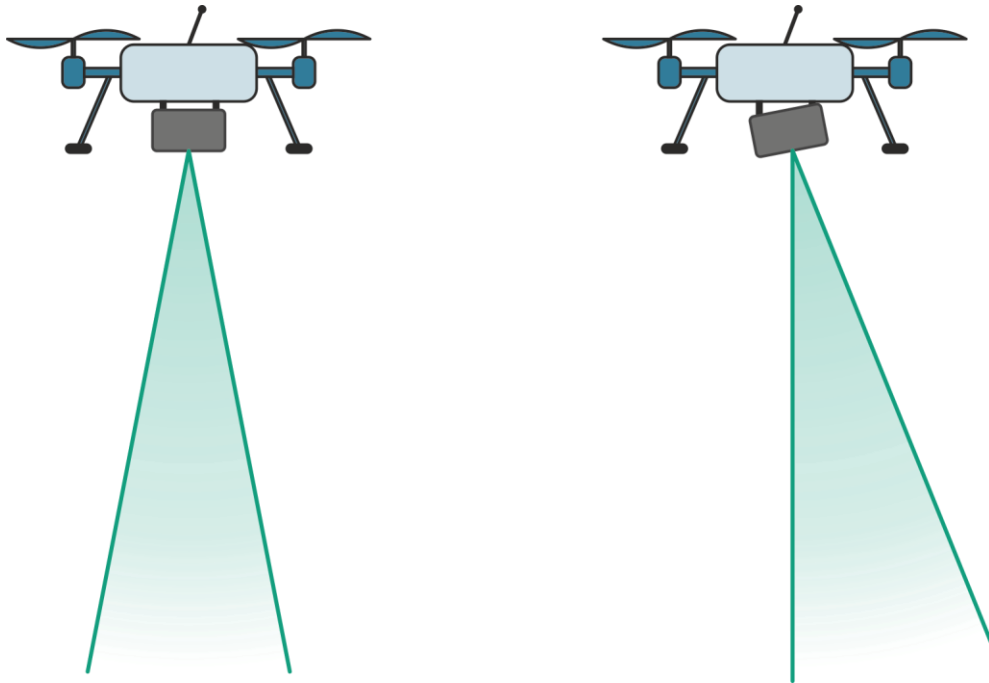
# High Resolution?

## Distribution of Water Surface Angles

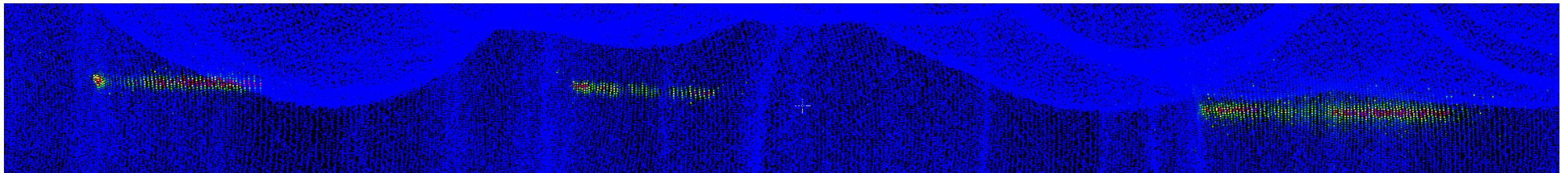
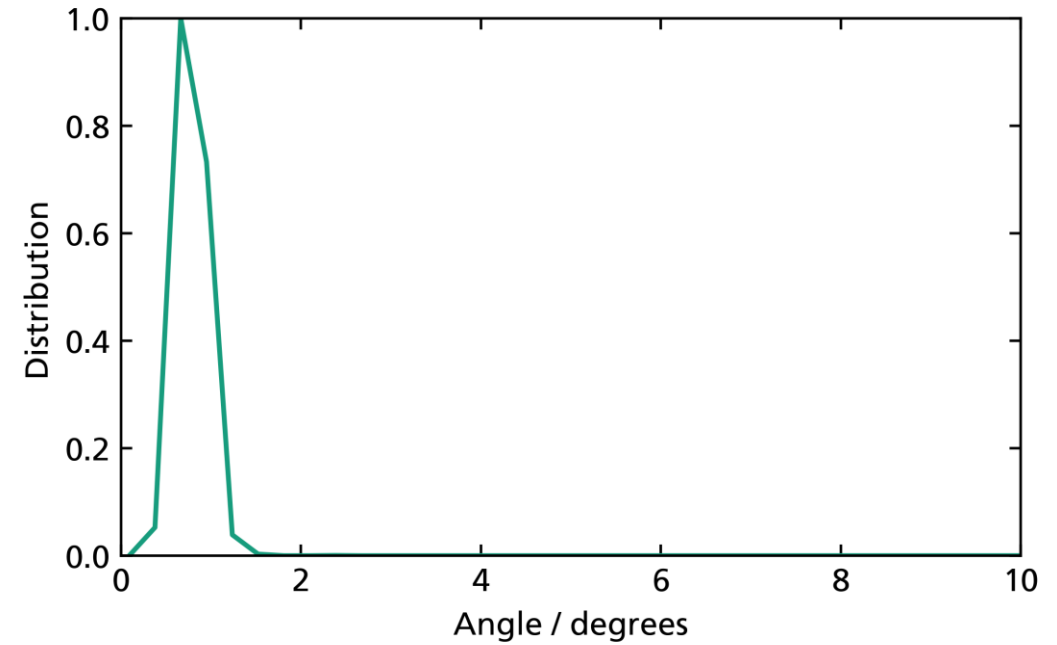


# High Resolution?

## Distribution of Water Surface Angles

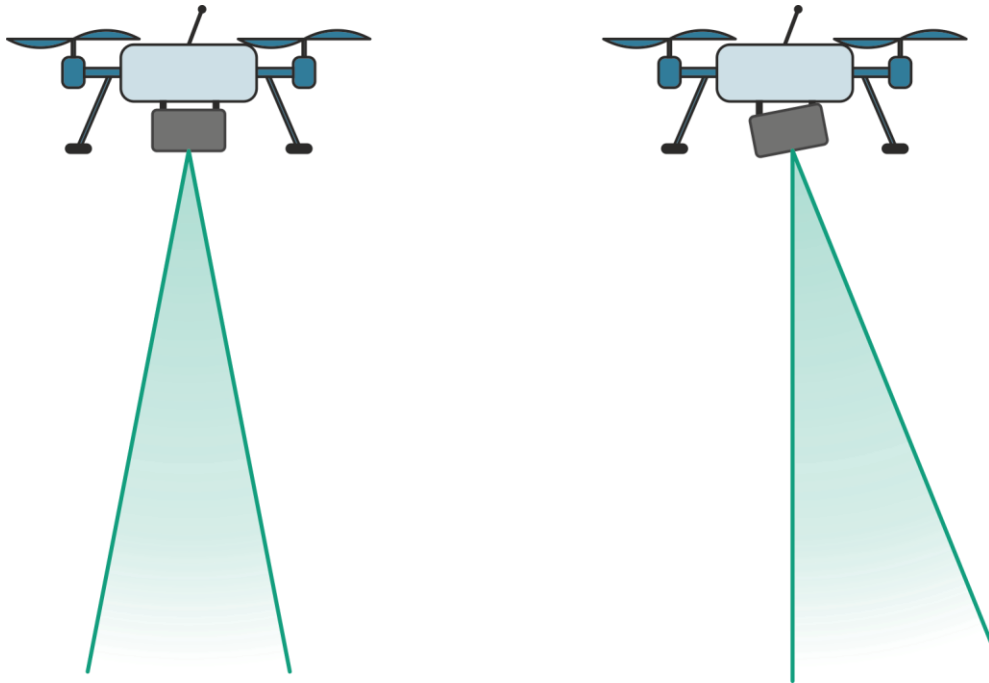


Excavation pond

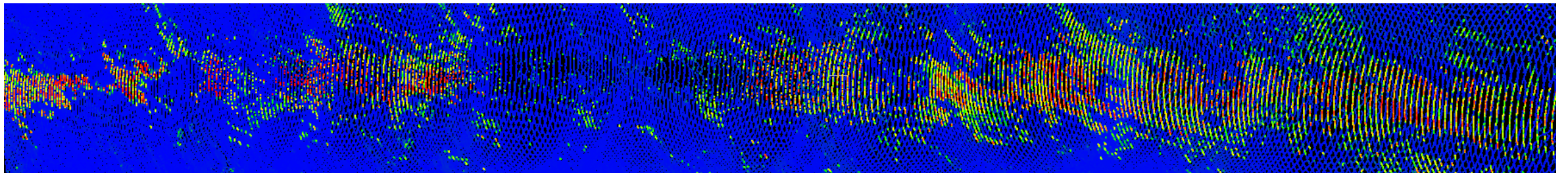
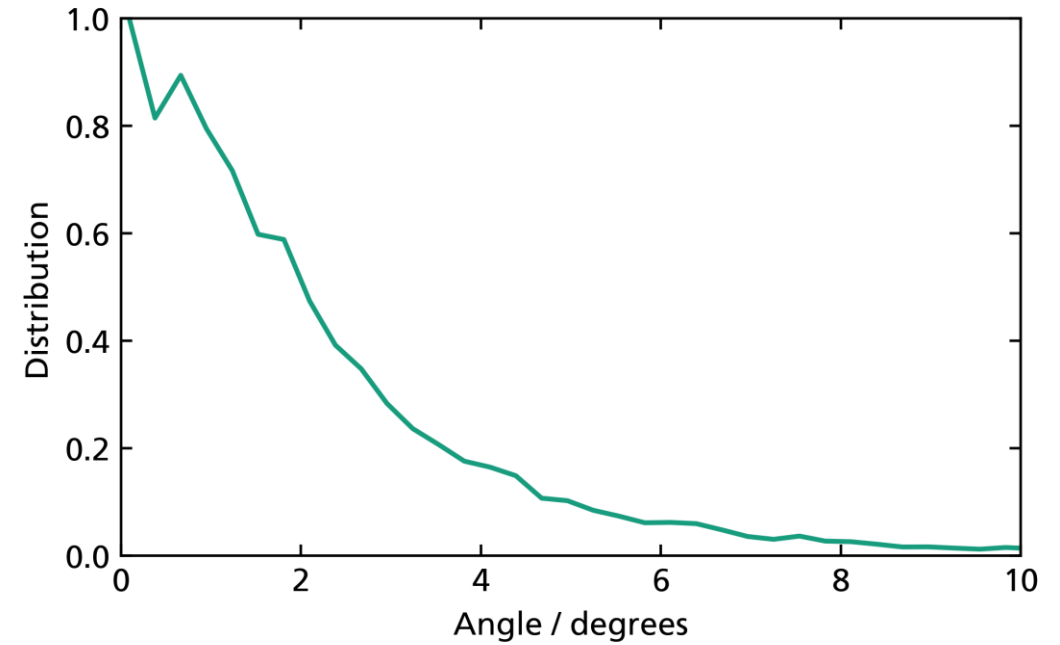


# High Resolution?

## Distribution of Water Surface Angles



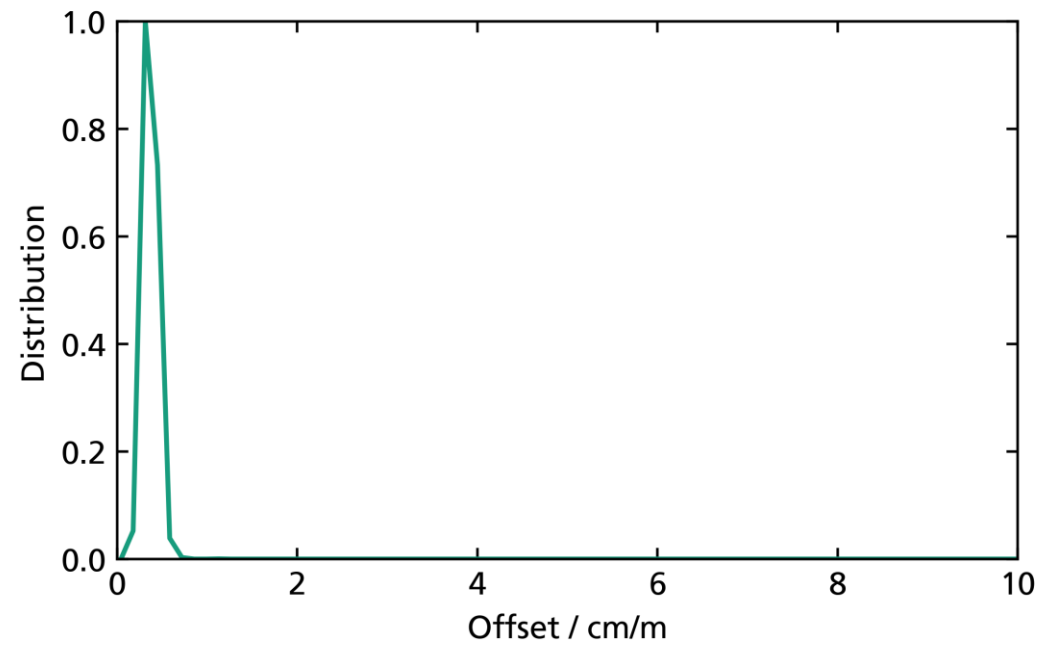
River (Isar)



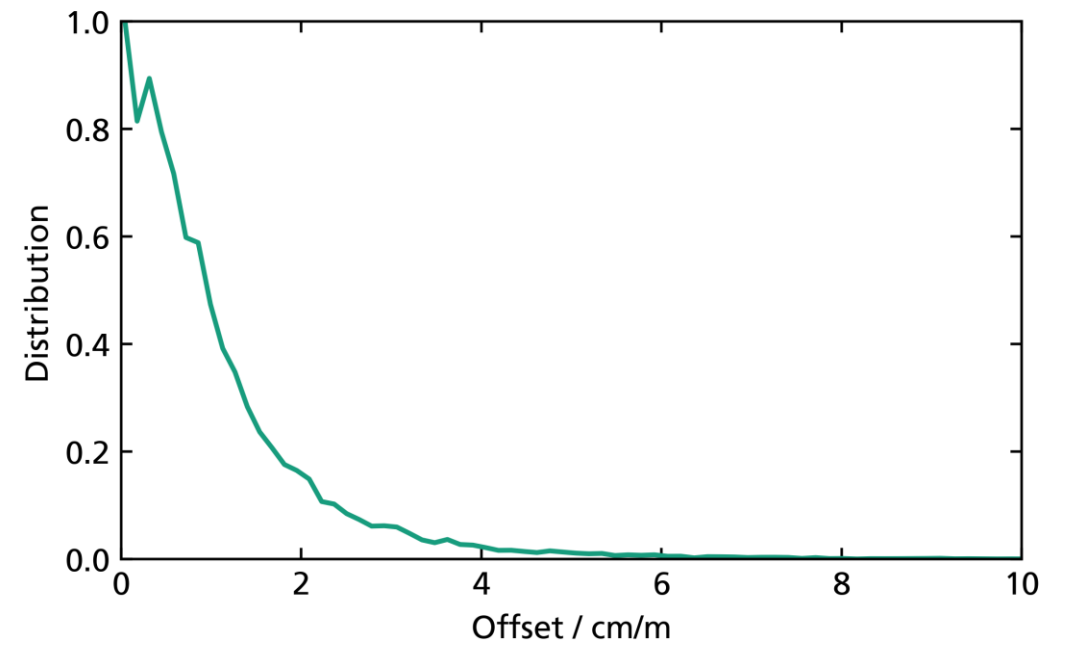
# High Resolution!

## Distribution of Offsets

Excavation pond



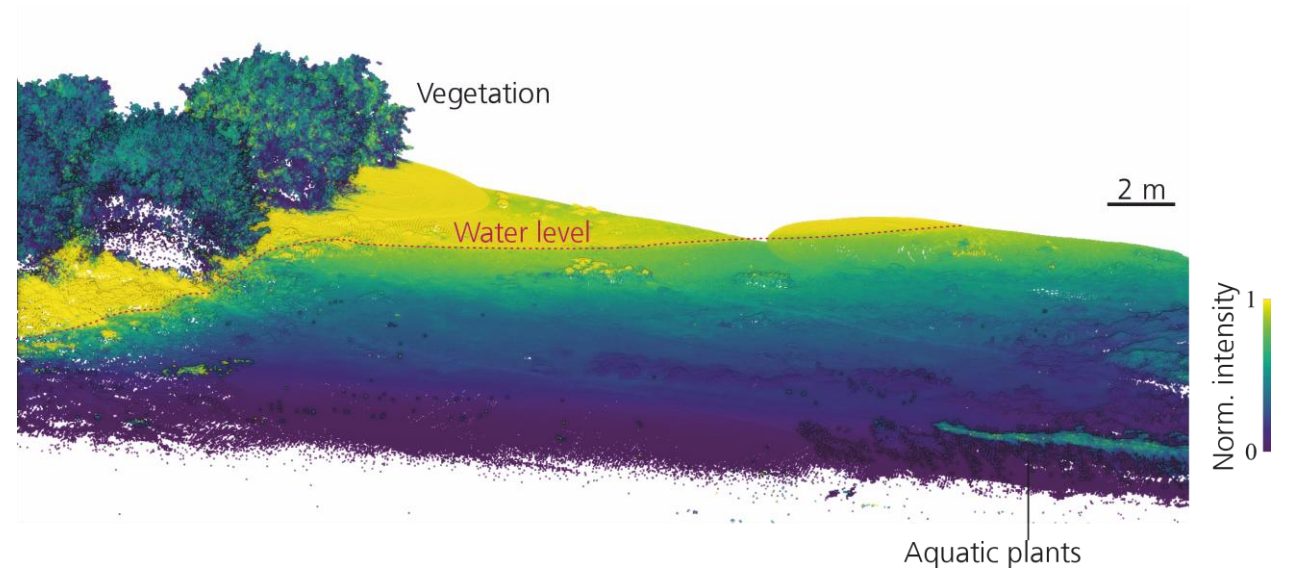
River (Isar)



# Results

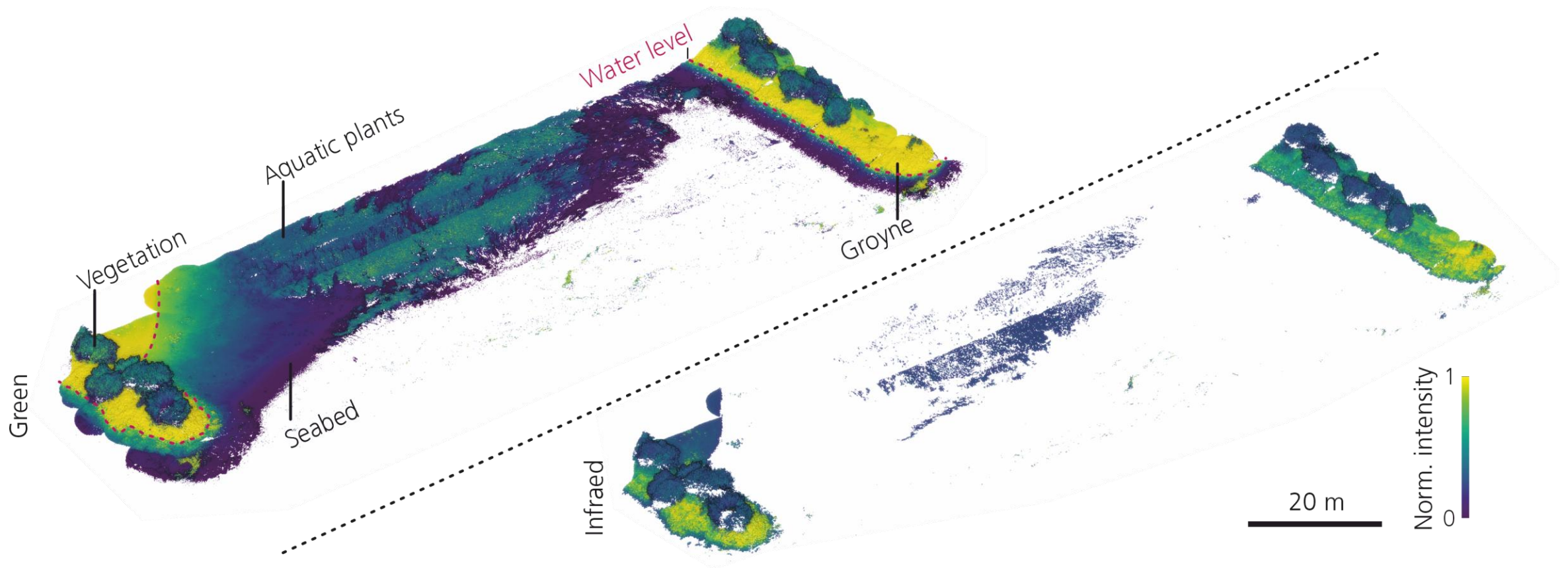
## River Rhine

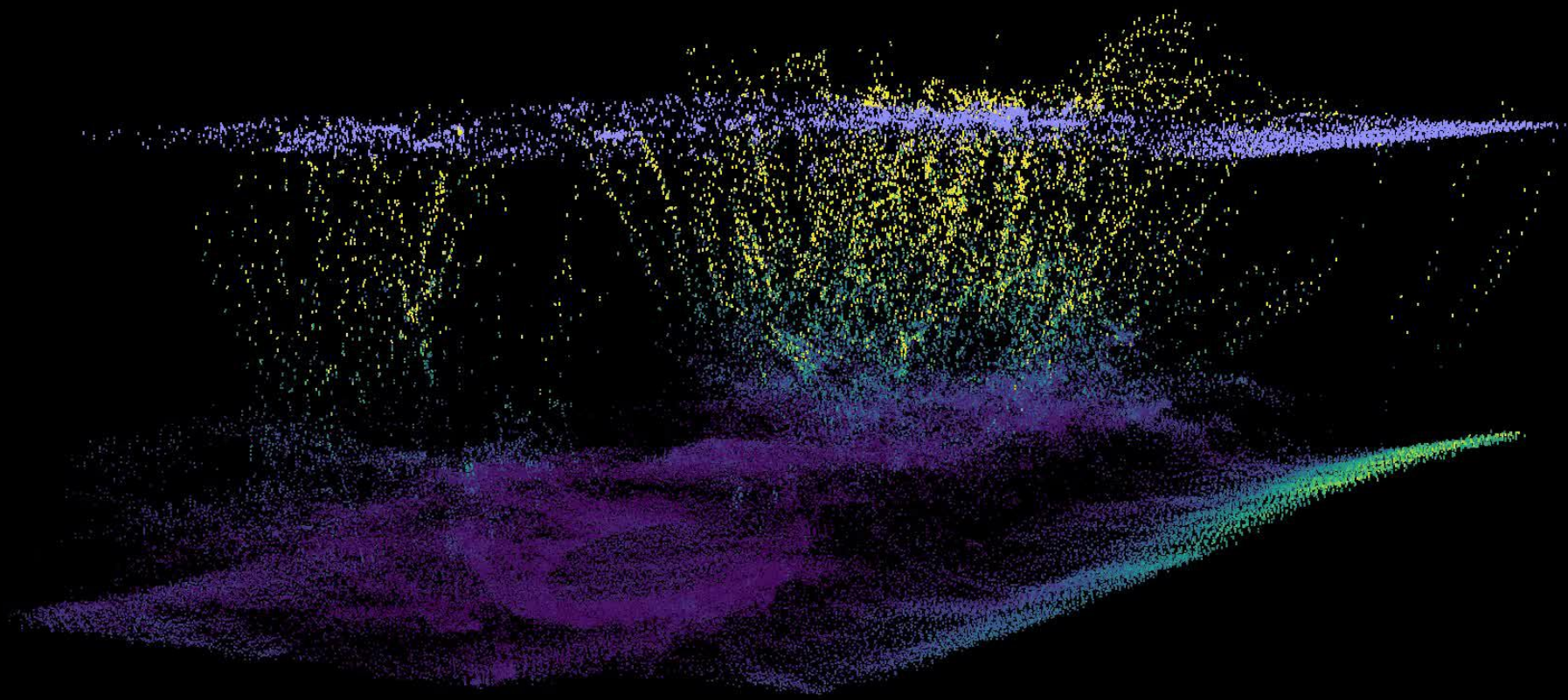
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# Results

## River Rhine





# Contact

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Fraunhofer IPM  
Georges-Köhler-Allee 301  
79110 Freiburg  
[www.ipm.fraunhofer.de](http://www.ipm.fraunhofer.de) | [LinkedIn](#) | [Twitter](#) | [YouTube](#)

Dr. Christoph Werner  
Group Leader Airborne and Underwater Scanning  
Tel. +49 761 8857-270  
[christoph.werner@ipm.fraunhofer.de](mailto:christoph.werner@ipm.fraunhofer.de)