



# DeeperSense Dissemination & Communication Material

Presentation by Tom Runge



# DeeperSense Logo





# DeeperSense Website



[www.deepersense.eu](http://www.deepersense.eu)





# DeeperSense Social Media



The screenshot shows the LinkedIn profile for DeeperSense. At the top is a blue header with white wavy lines. Below it is the profile picture, which is the DeeperSense logo. The name 'DeeperSense' is displayed in bold, followed by 'Forschung · Bremen · 22 Follower'. Below this, it says '1 Mitarbeiter:in auf LinkedIn ansehen'. There are three buttons: 'Follower:in' with a checkmark, 'Zur Website' with an external link icon, and 'Mehr'. A navigation bar below the buttons has tabs for 'Start', 'Info' (which is selected and underlined), 'Beiträge', 'Jobs', 'Personen', and 'Analysen'. The main content area is titled 'Übersicht' and contains three paragraphs of text describing the organization's mission and approach.

**DeeperSense**  
Forschung · Bremen · 22 Follower  
1 Mitarbeiter:in auf LinkedIn ansehen

[✓ Follower:in](#) [Zur Website](#) [Mehr](#)

Start **Info** Beiträge Jobs Personen Analysen

### Übersicht

The main objective of DeeperSense is to significantly improve the environment perception capabilities of service robots and therefore improving their performance and reliability, achieving new functionality, and opening up new applications for robotics.

DeeperSense adopts a novel approach of using Artificial Intelligence and data-driven Machine Learning / Deep Learning to combine the capabilities of non-visual and visual sensors with the objective to improve their joint capability of environment perception beyond the capabilities of the individual sensors.

DeeperSense will focus on underwater robotics as a domain to demonstrate and verify this approach as it is considered



# DeeperSense Word Template



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**Document History**

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**Consortium**

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Universitat de Girona	UdG	Spain
University of Haifa	UH	Israel
Krähen Robotik GmbH	KRA	Germany
Bundesanstalt für Umwelt, Naturschutz und Geologie	THW	Germany
Israel Nature and National Parks Protection Authority	INPA	Israel
Tecnología Ambiente SL	TA	Spain

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# DeeperSense PowerPoint Template



**DeeperSense**  
Deep-Learning for Multimodal Sensor Fusion  
Thomas Vögele, DFKI

Universitat de Girona, University of Guelph, KRAKEN, TECNOLAMBIENTE

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## Ambition & Objectives

Significantly **improve sensing** & environment perception in underwater robotics

- Use-Case1:** Diver monitoring
- Use-Case2:** AUV navigation in coral reefs
- Use-Case3:** Sea-bed mapping & classification

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## Approach

Use AI (DeepLearning) for „Intersensoric Learning“ (sensor A learns from sensor B)

- Sound2Vision:** Low resolution sonar learns from HD camera to „see“ in turbid waters
- EagleEye:** Forward looking camera learns from forward looking sonar to identify obstacles ahead
- SmartBottomScan:** Side-scan sonar learns from camera images to map & classify the sea-bottom sediments

**Phase 1: Training**  
Observes: Use AUV to convert low-quality data into high-quality output  
AUV is trained using low-quality data as input and high-quality data as output

**Phase 2: Operation**  
When Sensor A is unavailable, AUV converts low-quality data into high-quality representation

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## Expected Impact

- Algorithms finally tested and **validated in real environments** in Germany (Starnberger See), Israel (Red Sea), Spain (Mediterranean)
- Enable **new applications** in underwater robotics, e.g.
  - ROVs/AUVs to supervise diver activities in **turbid waters**
  - AUVs to explore coral reefs and other **complex structures**
  - Efficient exploration & **mapping of the sea-bottom with AUVs**
- Establish „Intersensoric Learning“ as new AI-driven method to **improve robotic perception** (underwater, terrestrial, air, space)
- Selected **training data sets published** via open data repository
- Close **interaction with robotics community** (e.g. DIH networks)

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