16.01.2025 / EERA Deepwind

Research and demonstration opportunities at the end of life of offshore test field alpha ventus

Bernhard Lange, Fraunhofer IWES

Welcome!

- A few words about alpha ventus and RAVE

- Which measurements are available?

- Decommissioning – the final phase of RAVE

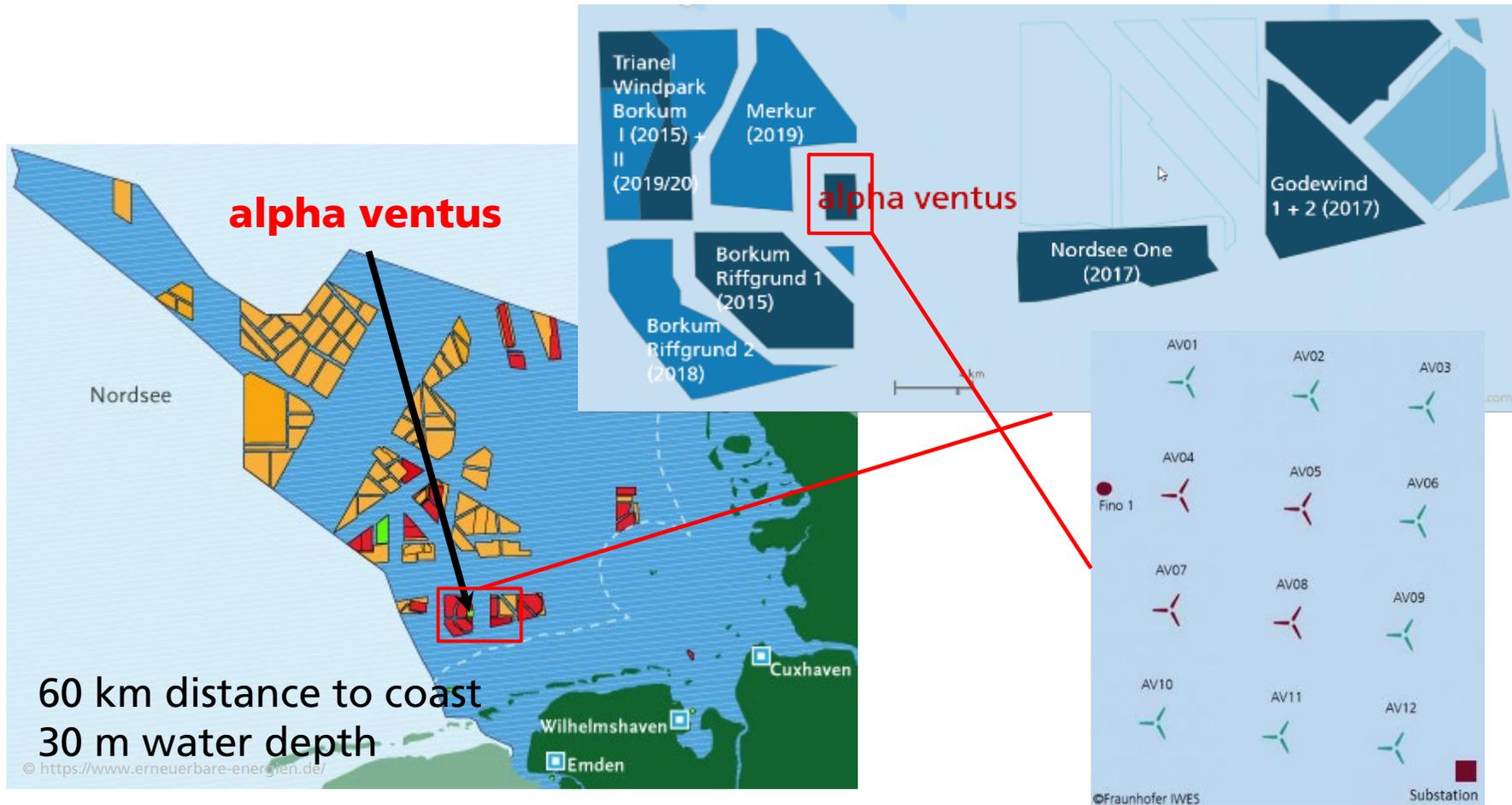- Research opportunities for you!

RAVE
RESEARCH AT ALPHA VENTUS

Offshore test field alpha ventus

First German offshore wind farm – built 2009
Test field with support from the German government

© DOTI www.alpha-ventus.de

RAVE
RESEARCH AT ALPHA VENTUS

Offshore test field alpha ventus

alpha ventus

Nordsee

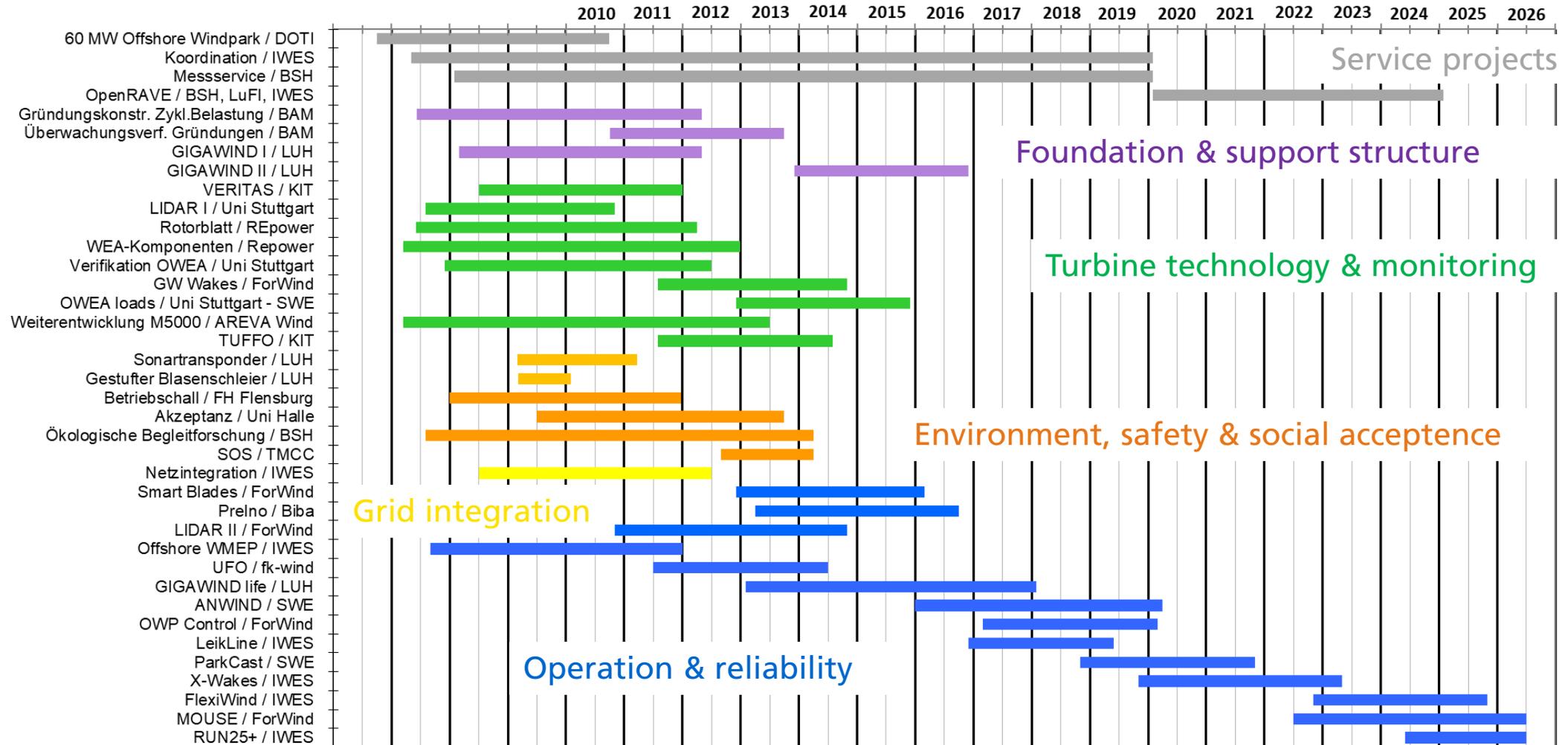60 km distance to coast
30 m water depth

© https://www.erneuerbare-energien.de/

12 turbines of 5 MW
- 6 Adwen M5000 on tripod foundations
- 6 Senvion 5M on jackets

RAVE
RESEARCH AT ALPHA VENTUS
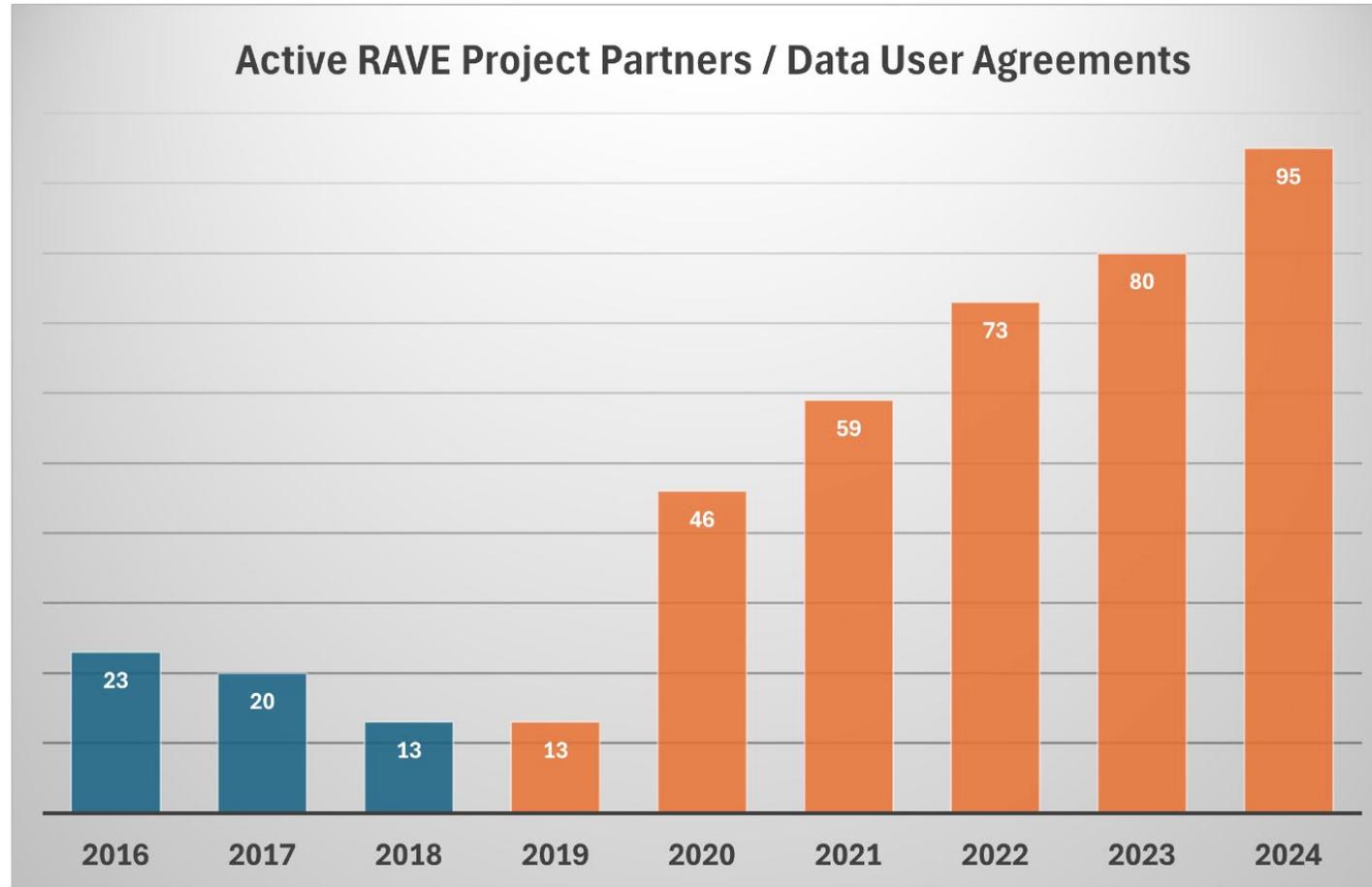
RAVE – Research at alpha ventus

- Accompanying research at the alpha ventus test field
- Funded by the Federal Ministry for Economic Affairs and Climate Action (BMWK)
- Running since 2007

> 120 million € research funding

> 35 R&D projects funded by BMWK

> 60 project partners

≈ 300 data users in total, 95 active in 2024

R&D projects

R&D projects

Active RAVE Project Partners / Data User Agreements

Year	Value
2016	23
2017	20
2018	13
2019	13
2020	46
2021	59
2022	73
2023	80
2024	95

RAVE measurement program

- 4 turbines instrumented
- 100m met mast FINO 1 in direct vicinity
- Oceanographic measurements
- Electrical measurements at substations
- SCADA and turbine controller data
- Special measurements (noise, water pressure, Lidar,…)
- Turbine design data from Senvion 5M

15 years of data, up to 1400 data channels
… and ongoing

www.fino-offshore.de 2012-01-05 CET 13:50:0

BMU-Forschungsplattform FINO 1, ©Germanischer Lloyd

RAVE
RESEARCH AT ALPHA VENTUS

Example: AV07

- ■ strain gauges
- ■ acceleration
- ■ acoustic sensors
- ■ hydrographic sensors
- ■ met data (sonic, lidar)
- ■ sonars
- ■ water pressure sensors
- ■ SCADA
- ■ corrosion
- 👁 video cam, radar

©Stiftung OFFSHORE-WINDENERGIE
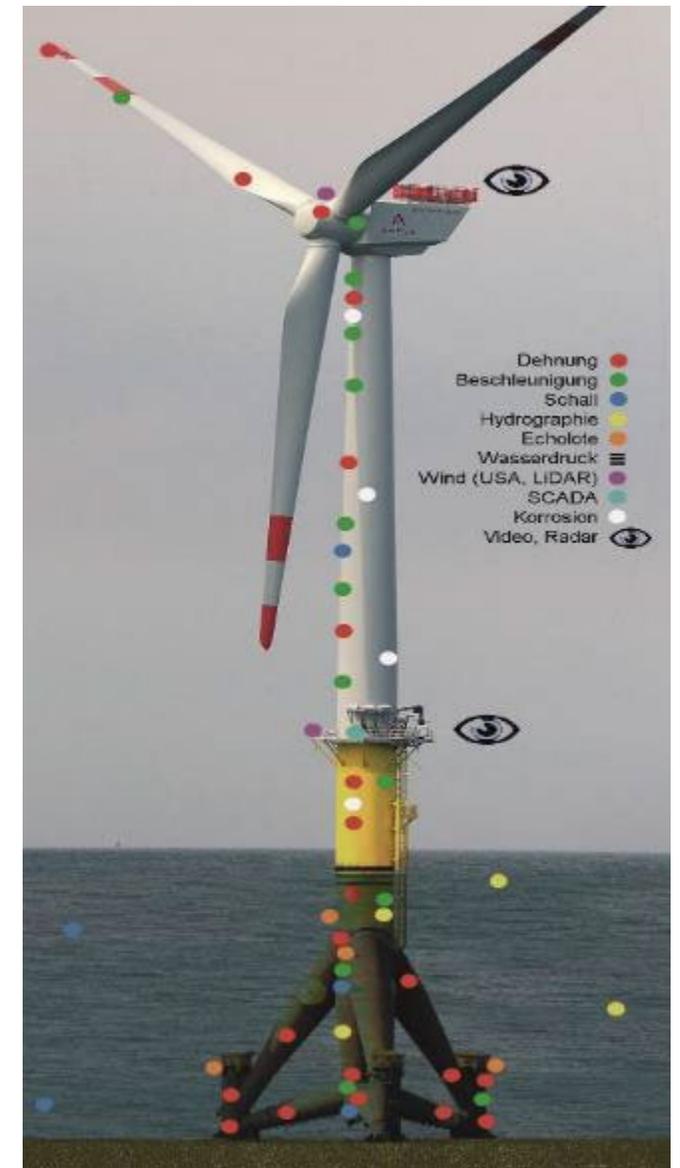
Data access

- RAVE is funded by the German government with the aim of supporting the development of offshore wind energy through research

- Measurement data is stored in the RAVE data base hosted by BSH

- Data is available for research without cost

- A standardised data usage agreement has to be signed

Next phase: Decommissioning of alpha ventus

- Alpha ventus is the first wind farm in Germany to be decommissioned (in about 3 years)
- Measurements will be continued to cover the entire life of alpha ventus
- The decommissioning of a test field is a unique opportunity for R&D in topics of decommissioning and lifetime

RAVE
RESEARCH AT ALPHA VENTUS

Research questions on decommissioning

A workshop was held last month with researchers, industry and authorities to start identifying open questions and research needs:

- How does the ecosystem around the turbines look like? Are e.g. protected species living in the scour protection?
- Can the area of a decommissioned wind farm be used for installation of a new turbine some time in the future?
- Which cutting/extraction method is best suited for foundations, cables and scour protection, also w.r.t. environmental impact and reuse of the ground
- Can the logistical concepts be optimised, also w.r.t. shortage of vessels and harbour areas?
- ….

RAVE
RESEARCH AT ALPHA VENTUS

Research opportunities

- The data collected in RAVE are open for research
- About 95 researchers work with the data
- There is an exchange in the community with workshops and webinars
- Projects range from Master thesis to international IEA projects

If you are intersted in RAVE and the RAVE data:

- Have a look at the RAVE website
- Get in contact: info-rave@iwes.fraunhofer.de
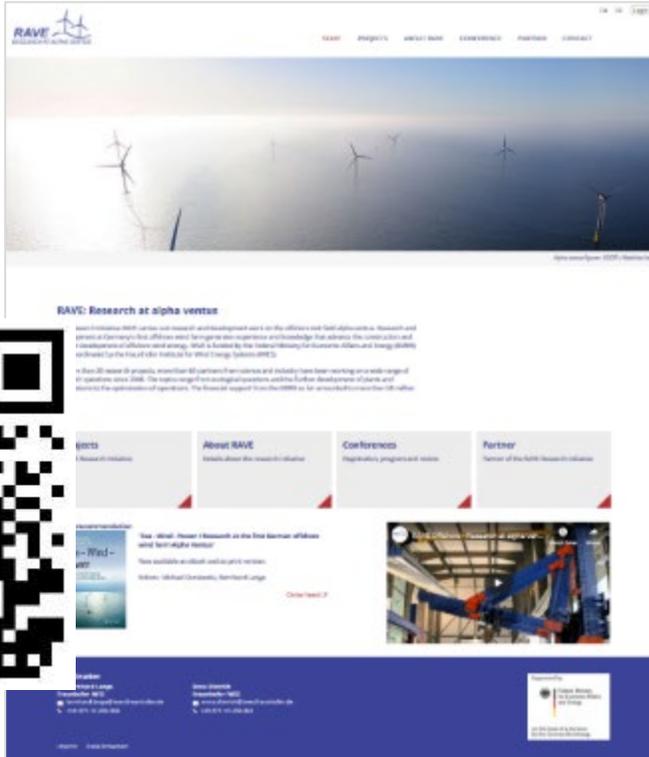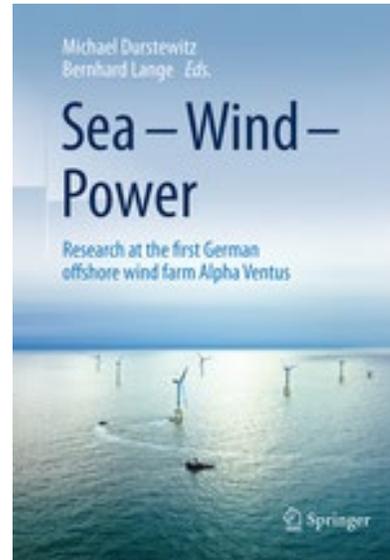
Save the date: Next RAVE Workshop 2. April 2025 in Berlin

More information about RAVE…

RAVE Homepage:
www.rave-offshore.de

RAVE video:
DVD and youtube

RAVE book (Springer):
Sea – Wind - Power

Offshore wind R&D conferences 2012, 2015 and 2018 and workshops 2020 - 2024

RAVE
RESEARCH AT ALPHA VENTUS

Thank you…

…to the BMWK for the funding of RAVE:

Supported by:

Federal Ministry
for Economic Affairs
and Climate Action

on the basis of a decision
by the German Bundestag

… and to you for your attention!

Bernhard.Lange@iwes.fraunhofer.de

RAVE
RESEARCH AT ALPHA VENTUS