

Object and shape detection technologies and R&D partnerships for space applications

Summary

Profile type	Company's country	POD reference
Technology offer	Germany	TODE20240603018
Profile status	Type of partnership	Targeted countries
PUBLISHED	Research and development cooperation agreement Commercial agreement with technical assistance	• World
Contact Person	Term of validity	Last update
<u>Johannes BÖHMER</u>	24 Jun 2024 24 Jun 2025	24 Jun 2024

General Information

Short summary

The German research institute for applied science develops mobile laser scanners and covers the entire 3D data process chain, from data capture to automated data analysis. The Institute focusses on special solutions and services for industry that are not typically available from commercial suppliers. The institute is looking for research cooperation partners, particularly for space technology applications as well as for commercial agreements with technical assistance.

Full description

The German institute is focussed on applied science and develops high-tech solutions, e.g. for object and shape detection. The focus is on research and development of very fast and robust measurement systems based on time-of-flight (TOF) measurement technology or camera systems.

Their offer in the field of imaging, object and shape detection:

- Development of tailor-made measurement systems
- Software development along the entire 2D and 3D data process chain

- Development of artificial neural networks (ANN) for automated data analysis
- Technology consulting and evaluation
- Feasibility studies and aptitude tests

The spectrum of the institute's customized measurement systems ranges from highly complex multispectral laser scanners to smartphones as measurement devices, which they equip with specially developed software for this purpose.

When evaluating data, they take advantage of the opportunities offered by current groundbreaking developments in machine learning. With the help of specifically trained artificial neural networks, they are able to automatically identify a large number of object classes and object surfaces in measurement data. This enables them to extract maximum information from measurement data and to gain new information from existing measurement results. Their turnkey systems consist of high-precision measurement devices with downstream automated data analysis.

The institute is particularly experienced in the automated interpretation of 3D and image data. Complex learning algorithms based on the concept of »deep learning« with artificial neural networks (ANN) are used for the evaluation of 3D data. Today, thanks to massive parallelization, this process can be accomplished in just a few hours. The evaluation of new data sets based on a trained ANN is then even conducted in real time. ANNs have proven to be very robust to variations on characteristic colors, edges and shapes.

Furthermore, the institute focuses on the application-specific optimized visualization of measurement data. To this end, the information necessary for reliable decision-making is extracted from the measurement data and displayed in an intuitive format. The institute develops software for visualizing measurement results and findings generated automatically from measurement data, for example with regard to earth surface and environmental data.

The institute is now welcoming partners interested in its object and shape detection expertise, particularly in space-related applications. For example, the growing trend towards hyperspectral mapping and analysis of ground structures, vehicles, buildings, vegetation etc. generates huge amounts of data and requires advanced methods for automated data analysis and data fusion. In particular, the institute is now looking for:

1. Companies interested in bilateral collaboration and R&D services provided by the institute, e.g. for space applications
2. Companies and R&D institutions active in the field of space technology as partners for project consortia, also with public funding. (Concerning public funding, the preference is on funding programmes where the full costs of the Institute are funded. Alternatively, the funding gap may be closed by a contribution from partners).

Advantages and innovations

Commercial suppliers of 3D data acquisition systems are specialized on scalable applications. They rely on commercially available, standardized and mass-fabricated parts, whereas the institute specializes in customized systems, which are tailored to specific applications and typically cannot be provided by commercial suppliers. This applies particularly to 3D data processing, where, for instance, object classes for automated object recognition in 3D data are adapted to specific applications and processes for fusing data from different data sources are implemented. In this context, the institute also draws on its expertise in multispectral data analysis, semantic segmentation, geometrical data analysis and processing of large 3D point clouds.

For optical measurement systems, the institute covers the entire value chain: from the development of high precision laser scanners to system integration including lighting and camera systems. The eye-safe systems are robustly designed for use on mobile platforms such as measurement trains, vehicles for road surface measurement, subsea vehicles or UAV. The laser scanners are fitted with various types of deflection units tailored to the deflection speed, resolution and scan field needed for the specific measurement task.

Finally (and in contrast to many commercial suppliers), cooperation is also possible within publicly funded projects.

Technical specification or expertise sought

Stage of development

Lab tested

IPR Status

Secret know-how

IPR Notes

Sustainable Development goals

• **Not relevant**

Partner Sought

Expected role of the partner

The institute is open to all types of partners.

Tasks to be performed by the partner sought/Expected role of the partner:

Companies interested in bilateral collaboration and R&D services provided by the institute, e. g. for space applications.

Companies and R&D institutions active e. g. in the field of space technology as partners for project consortia, also with public funding. (Concerning public funding, the preference is on funding programmes where the full costs of the institute are funded. Alternatively, the funding gap may be closed by a contribution from partners).

Type of partnership

Research and development cooperation agreement

Commercial agreement with technical assistance

Type and size of the partner

- **R&D Institution**
- **Other**
- **SME 50 - 249**
- **SME 11-49**
- **SME <=10**
- **University**
- **Big company**

Dissemination

Technology keywords

- **02009009 - Sensors for cars and transport**
- **02011005 - Space Exploration and Technology**
- **09001009 - Sensor Technology related to measurements**
- **02009007 - Artificial intelligence applications for cars and transport**

Targeted countries

- **World**

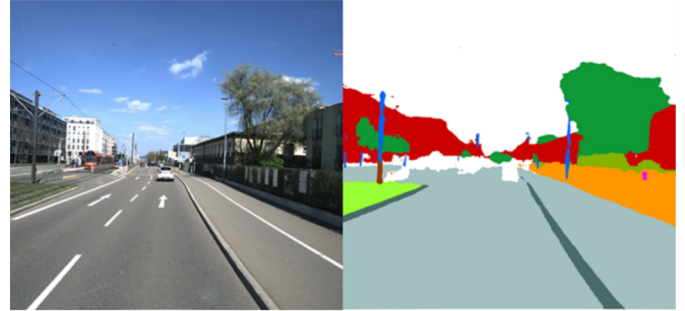
Market keywords

- **09001007 - Other transportation**
- **03007002 - Other measuring devices**
- **08002002 - Industrial measurement and sensing equipment**

Sector groups involved

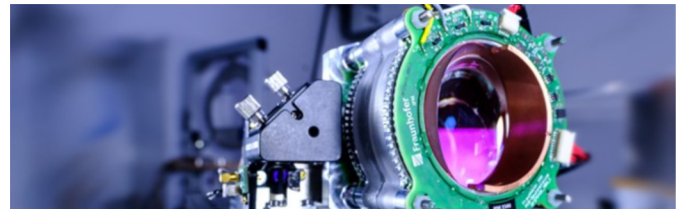
Media

Images



[The entire 3D data process chain is covered](#)

[Semantic segmentation of point clouds](#)



[Fusing photogrammetric data with laser scanner data provides a detailed image of complex scenarios](#)

[Custom deflection units for laser scanning](#)