

Production control technologies and R&D partnerships for space applications

Summary

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|-------------------------------|--|------------------------|
| Profile type | Company's country | POD reference |
| Technology offer | Germany | TODE20240618018 |
| 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

A German research institute for applied science develops special production control solutions, including optical systems and imaging methods to inspect or analyse surfaces and 3D structures in production and to control manufacturing processes. They focus on customized services for industry not typically available from commercial suppliers. The institute seeks research cooperation partners, particularly for space technology applications as well as commercial agreements with technical assistance.

Full description

The German institute is focused on applied science and develops high-tech solutions, e. g. for production control. The institute develops optical systems and imaging methods which can be used to inspect or analyse surfaces and 3D structures in production and to control manufacturing processes. The systems measure fast and accurately, detecting small defects or impurities even at high production speeds. This means that the systems enable 100 percent production control in real time. A wide range of methods is used, including digital holography, infrared reflection spectroscopy and fluorescence methods, combined with fast, low-level image and data processing. The systems are used in applications such as forming technology in the automotive industry and for quality control in medical products.

Applications include:

- Surface analysis and materials testing: Imaging systems developed at the Institute measure coating thicknesses of body panels, strip metal or small components down to the nanometre range and detect contamination of just a few milligrams per square meter over 100 percent of the surface. Measurements are performed so quickly that inspection of cleanliness and coating is possible directly in the production line. Furthermore, Laser-induced breakdown spectroscopy (LIBS) is used to reliably and precisely determine the elemental composition of metal surfaces and coatings with just a few pulses of laser light. Also, special coatings like permeation barriers for hydrogen can be inspected.

- Surface inspection: The Institute develops inspection systems for monitoring the quality of technical surfaces – from complex 3D components to fine wire. 100 percent of the surface can be inspected within seconds and with an accuracy down to the micrometre range. Some of our systems (such as our free fall inspection system) even allow such an inspection without additional handling.

- Geometry measurement: The Institute relies on digital multi-wavelength holography for contactless, high-precision (down to sub-micrometre-range) and fast (less than a second for the whole 3D surface up to several cm²) component testing. The robust measurement systems can be integrated directly into production systems or machine tools.

- Component identification: Complete traceability of the production history is useful also for mass-produced components in order to continuously optimize production processes. The Track & Trace fingerprint systems developed by the Institute reliably identify components at one-second intervals, even with batch sizes of several 100,000 units – marker-free and tamper-proof.

- Deformation measurement: The Institute develops fast and robust measurement technology for materials testing that enable strain and deformation measurement with micrometre or nanometre precision. The measurement systems are suitable for materials testing as well as for measuring machine parts or electronic components during operation. The Institute is now welcoming partners interested in its production control inspection methods, particularly in space-related applications. For example, the growing trend towards Commercial Off-The-Shelf (COTS) parts and large fabrication numbers can fuel the needs for advanced fast inspection methods that can also be applied in the production line. 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

- The optical inspection systems development is focussed on integration in production process. Such inline systems have to be fast (typically 1 s / measurement), precise in the measurement of relevant parameters (geometrical, surface analysis and inspection) and robust (for 24/7 usage). The Institute's robust systems are excellently adapted to these requirements. Small defects or impurities can be detected with high accuracy, even at high production speeds. This means that 100 percent production control in real time is possible.

- Each system can be customized to the customer's needs.

- In contrast to many suppliers of measurement systems, cooperation is also possible on the basis of publicly funded projects (German research programs such as ZIM or KMU innovativ, European programs such as Eurostars etc.).

Technical specification or expertise sought

Stage of development

Available for demonstration

IPR Status

Secret know-how

IPR Notes

Sustainable Development goals

• **Not relevant**

Partner Sought

Expected role of the partner

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

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 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

Type and size of the partner

Research and development cooperation agreement
Commercial agreement with technical assistance

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

Dissemination

Technology keywords

- **02009018 - Measurement devices**
- **02003001 - Process automation**
- **09001007 - Optical Technology related to measurements**
- **09001006 - Optical material testing**

Targeted countries

- **World**

Market keywords

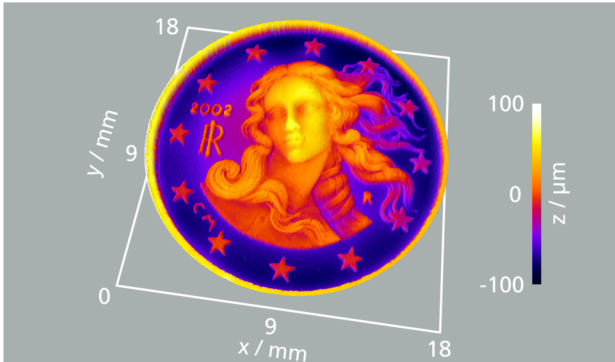
- **08002002 - Industrial measurement and sensing equipment**
- **08002005 - Machine vision software and systems**
- **03005 - Laser Related**
- **08002007 - Other industrial automation**
- **08002003 - Process control equipment and systems**

Sector groups involved

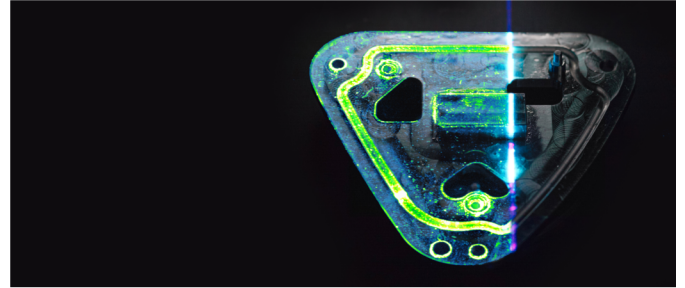
- **Aerospace and Defence**

Media

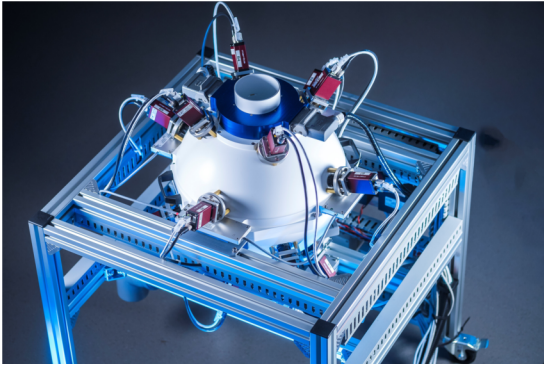
Images



[Digital Holography: \(sub-\) micrometre 3D measurement of surfaces in less than a second](#)



[F-Scanner: Inspection surface cleanliness and coatings:](#)



[Detection of defects and texture on 100% of the surface with "Inspect-360": free-fall inspection](#)