

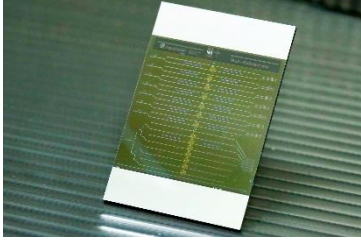
We are pleased to introduce you to Fraunhofer TechFlash - Fraunhofer's Flash News on latest and exciting technologies.

This week's TechFlash is about **New technologies in Photonics Microsystems**:

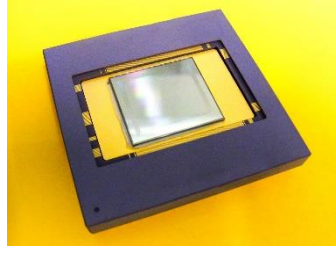
1. Custom-made photonic components
2. Qualified micro scanners for customized medical applications
3. Microtechnology conquers space for more precise earth observation
4. From Microchips to Holograms – the Perfect Light Modulation

Fraunhofer Institute for Photonic Microsystems (IPMS) is a worldwide leader in research and development services for electronic and photonic microsystems in the fields of Smart Industrial Solutions, Medical & Health applications and Mobility. Innovative products can be found in all large markets – such as ICT, consumer products, automobile technology, semiconductor technology, measurement and medical technology – products which are based upon various technology developed at Fraunhofer IPMS.

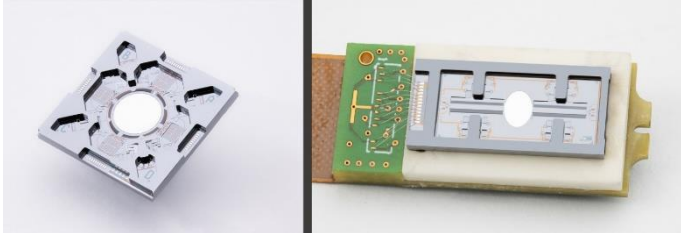
Custom-made photonic components



Biosensor chip from Fraunhofer IPMS



Micromirror array with 8 million phase-shifting pixels with group-by-group control for the development manufacturing technology



Example of a quasi-static MEMS scanner mirror (left: translation, right: 1D torsion)

Fraunhofer IPMS has developed innovative, customized, and sustainable systems which are highly advanced in areas such as micro-optics, MEMS-based light modulators and biophotonics.

- Photonic Biosensor - Fraunhofer IPMS develops photonic label-free biosensors based on integrated photonic components fabricated in silicon nitride technology, such as microring resonators and Mach-Zehnder interferometers. They are used for the selective detection of biomarkers or microbial substances and offer a suitable detection method for e.g. the early detection of diseases.
- Photonic Microsystems for High-Resolution Lighting Control - Fraunhofer IPMS has developed spatial light modulators with up to several million mirrors on a semiconductor chip.
- Custom MEMS Scanner Design and Qualified Production - Fraunhofer IPMS has extensive expertise in the development and production of MEMS scanners based on monocrystalline silicon. These components are characterized by large scanning angles, high scanning frequencies, on-chip position sensors and excellent long-term stability.

We look forward to hearing of your interest to discuss your requirement.

Yes, I am interested

Qualified micro scanners for customized medical applications



Quasi-static scanner in a module for head-mounted displays



Customer Evaluation Kit for quasi-static MEMS scanners



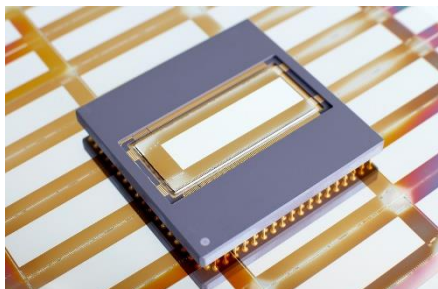
Laser scanning microscope for tumour delineation

Micro scanners are tiny optical components that can deflect tiny mirrors around one or more axes to enable very fast and precise scanning or projection. Their non-contact operation, small size, low weight and high energy efficiency open up new possibilities in medical technology. The potential of micro scanners in medical technology is immense. Their small size, low weight and high energy efficiency make them ideal for mobile use. Medical applications for micro scanners include image acquisition for medical endoscopes, confocal microscopy, fluorescence microscopy, spectroscopy and ophthalmology. More than 200 different micro scanner designs have been developed at Fraunhofer IPMS to meet customer-specific requirements. The range of services covers the entire value chain, from design and prototype development to pilot production in its own clean room on 8" wafer. Fraunhofer IPMS is continuously expanding the application range of scanner mirror technology with novel and patented design solutions and technology modules as well as the integration of artificial intelligence.

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Yes, I am interested

Microtechnology conquers space for more precise earth observation



Mirror array with one million individual mirrors



Satellite for earth observation

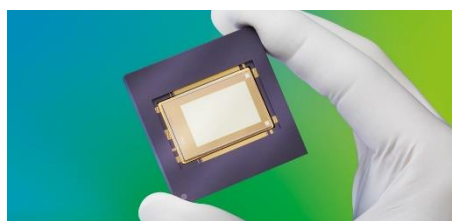
Earth observation is becoming increasingly important to help us better understand our planet and address environmental and societal issues. However, collecting and processing data from space currently faces obstacles. For example, it takes a long time, sometimes several days, to obtain information. In addition, the images are not always very accurate, showing only coarse details of about a kilometre in size, and capturing the invisible part of the light is very costly with current technologies.

As part of the EU-funded SURPRISE project, a team of experts has been investigating how Earth observation satellites can be made smarter, but also safer. Using two breakthrough technologies - spatial light modulators and Compressive Sensing - the project has developed a demonstrator for super spectral Earth observation with improved spatial resolution, on-board data processing and encryption functionality.

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Yes, I am interested

From Microchips to Holograms – the Perfect Light Modulation



Micromirror array in ceramic package; 512x320 individually addressable mirrors with 48µm pixel size



Application example real 3D projection: Automotive Head-Up-Display (HUD)



2-axis tilting mirror module of Fraunhofer IPMS; SLM chip with control electronics

In its own laboratories and the 1500 m² clean room, Fraunhofer Institute for Photonic Microsystems IPMS develops a wide variety of application-specific spatial light modulators based on 200 mm wafer technology. These photonic microsystems modulate light using small, controllable mirrors to create unique images and structures. These so-called spatial light modulators (SLM) are micromirror arrays with up to several million mirrors on a semiconductor chip. They have applications in semiconductor manufacturing, microscopy and holography, and have brought the Institute to the forefront of international research in this field.

We look forward to hearing of your interest to discuss your requirement.

Yes, I am interested

About Fraunhofer-Gesellschaft:

Founded in 1949, the Fraunhofer-Gesellschaft based in Germany is the world's leading applied research organization. It offers contract-based R&D services for specific industry demand, application-oriented technology development from proof-of-principle up to market-readiness across the value chain and offers technical consultancy and feasibility studies to nearly all the industry sectors. The Fraunhofer-Gesellschaft currently operates 76 institutes and research units throughout Germany. Over 30,800 employees, predominantly scientists and engineers, work with an annual research budget of €3 billion. Fraunhofer generates €2.6 billion of this from contract research. Our global footprint is very strong, with offices and research centres in the USA, Europe and Asia. Some of our renowned innovations are the MP3 software, white LED's and the smallest of cameras. Fraunhofer has been a long-time trusted innovation partner in India, collaborating with some of the major players in the fields of Material Science, Energy, Environment, Automotive, Electro-mobility, Production Technology, Microsystems and Smart Cities, working with Industry, Government and Public Sector.

Kindly contact Mr. Aditya Fuke, Senior Manager – Strategic Projects, Smart Cities & IoT at Fraunhofer Office India for further details.

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