

FRAUNHOFER IN INDIA NEWSLETTER - ISSUE 2 / 2013



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A unique ecosystem that accelerates research from lab to market

Dear Readers,

It is almost a year since we inaugurated our Indian office in Bangalore, housing an Experience Theatre which showcases some of our technologies, as well as the Fraunhofer Innovation and Technology (FIT) Academy which brings Fraunhofer experts from various Institutes to connect with our clients and partners. While we have been active in India for several years, this augmentation of our visibility has indeed resulted in highlighting our competencies and unique positioning across industry, academia and government. Very often I am asked this question: How does Fraunhofer achieve its present positioning: 66 Institutes, nearly 20 research centres, 22,000 employees and an annual budget of 2 Billion Euros? The answer lies in the unique ecosystem which has evolved over 60 years, that is much admired globally but difficult to replicate elsewhere in the world. Mr. Barack Obama underscored his admiration for Fraunhofer, when he announced a 2 Billion Dollars funding to set up a Centre of Excellence for Manufacturing in USA two years ago, on the lines of Fraunhofer. Several countries like France, China, Korea and England often discourse with Fraunhofer to understand the structure and functioning of our organization. Back home in India, Prime Minister Manmohan Singh mentioned Fraunhofer's excellent model for Industry-Academia cooperation during the Council of Science and Industrial Research (CSIR) advisory meet. And the list goes on.....

The fact that each Institute has to generate at least 50% of its budget through client financed projects, ensures that Fraunhofer stays focused on applied research. The funding from the Government to the tune of nearly 30% of its budget makes it possible for Fraunhofer to undertake basic research and thus stay ahead of the technology curve. Our growth in India is exciting, as we move into a more strategic and long term partnership with our clients and partners. Increasingly, we are entering into long term R&D cooperation, where we not only work with industry on New Product Development but also with the Government on augmenting the research capability and delivery in India. Many examples of our cooperation are illustrated in this newsletter and I do hope you will enjoy reading them. Also on showcase are the path-breaking technologies developed by our various institutes. Please do revert to us if you find any of these articles of interest.

We look forward to your feedback and contact,

Happy Reading!
Anandi Iyer

“Annually, Fraunhofer conducts nearly 7500 projects thus constantly pushing the envelope and working not just with the large companies but more so with the SMEs that are the real drivers of innovation. When the world went through an economic crisis in 2009-2010, Germany was one of the first countries to bounce back. Fraunhofer was lauded as the ‘real stimulus package’ for the German Industry as it focused on resource efficient production and innovation to support the German Industry become profitable in a really short span.”

*Ms. Anandi Iyer, Head,
Fraunhofer Representative
Office India*



The journey so far...

The past year has been a busy and exciting one for the Fraunhofer Representative Office India. The Office has been bustling with many activities since its inaugural, with workshops & conferences at the Fraunhofer Innovation and Technology (FIT) Academy, industry collaborations and delegation visits. The Fraunhofer Experience Theatre showcasing our latest technologies, and the FIT Academy, both at the Fraunhofer Office, hosted industry-specific workshops on cutting edge technologies with the support of top Fraunhofer experts.

The unique “Fraunhofer ecosystem for applied research”

We are delighted, that Dr. Manmohan Singh, the Indian Prime Minister gave a special mention of the “Fraunhofer model” of applied research in one of his addresses to high powered advisory group of the Council of Scientific and Industrial Research (CSIR). Incidentally, this model was presented to various Indian Ministries and industrial bodies. On April 15, 2013, Ms. Anandi Iyer was invited to present this model to Dr. Pallam Raju, the Minister of Human Resource Development (HRD) and his group of Advisors.

Several key personalities from the government, industry and academia who visited the Representative Office in India were taken through the Fraunhofer activities. They were also given a tour of the Experience Theatre which showcases Fraunhofer Institutes’ competencies. As a part of the summer school programme organized by BayIND, students from various Bavarian Universities also visited Fraunhofer office in September this year.

The new Consul General of the Federal Republic of Germany, Mr. Jörn Rohde during his visit to Fraunhofer office said, “India’s rapid economic development and incredibly diverse culture makes me feel honored to represent my country in this region. The second Intergovernmental consultations held on April 13, 2013 under the chairmanship of German Chancellor Angela Merkel and India’s Prime Minister Manmohan Singh in Berlin saw the launching of India-Germany High Technology Partnership Group (HTPG). The HTPG just held its first meeting on September 09, 2013 in Berlin under the Joint Chairmanship of State Secretary Mr. Harald Braun (German Foreign Office) and India’s Foreign Secretary Smt. Sujatha Singh.”

Fraunhofer’s engagement with the Indian market

Indian economy is witnessing unprecedented levels of economic expansion and is rapidly emerging into a major market for global businesses. More than 30 out of the 66 Fraunhofer Institutes are keen on collaborating with Indian industries across a broad

Fraunhofer delegation visits to India this year:

- Dr. Dirk Berthold and Prof. Dr. Volker Thole, Fraunhofer WKI
- Prof. Dr. Dieter Rombach, Fraunhofer IESE
- Dr. Sabine Brunswicker, Fraunhofer IAO
- Dr. Andreas Sterzing and Dr. Christian Hannemann, Fraunhofer IWU
- Mr. Frank-Holm Rögner, Fraunhofer FEP
- Mr. Anselm Kröger-Vodde, Dr. Jochen Rentsch and Dr. Roland Schindler, Fraunhofer ISE
- Dr. Kristian Arntz and Mr. Dominik Heeschen, Fraunhofer IPT
- Mr. Nicolas Komorek and Mr. Kristian Kuhlmann, WBA, Aachen
- Mr. Franz-Josef Wöstmann and Mr. Michael Heuser, Fraunhofer IFAM
- Mr. Sven Schiller, Fraunhofer IWU
- Mr. Andreas Weber, Fraunhofer UMSICHT
- Dr. Dirk Berndt, Fraunhofer IFF
- Mr. Kay Matzner, Fraunhofer IFF
- Mr. Rajesh Shankar Priya, Fraunhofer MOEZ



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1. The Indian delegation at Fraunhofer FEP, Dresden. © Fraunhofer FEP

2. Fraunhofer-SEMI Roundtable Discussion in August 2013

3. Mr. Wöstmann presenting to Indian Foundry SMEs during his recent visit

“As Consul General for Karnataka and Kerala, I am very happy to see the two countries strengthening ties in the field of Science and Technology and would be glad to further boost this cooperation in the coming years. With 66 Institutes, a staff of over 22,000 and an annual budget of Euros 2 Billion, Fraunhofer is considered to be one of the premier research and technology organizations in the world. It’s presence in Bangalore will definitely be an added advantage.”

Mr. Jörn Rohde, Consul General of the Federal Republic of Germany

range of activities, and are working closely with the Fraunhofer office in India towards developing strategies for their entry into the market. Market research, client mapping, organization of workshops and roundtable discussions are some of the activities being carried out to bring these Institutes closer to the Indian clients.

In January 2013, the Fraunhofer Institute for Wood Research WKI, together with Eberswalde University and the Indian Plywood Industries Research and Training Institute (IPIRTI), successfully organized the Indo-German workshop on “Resource Efficiency and Health Aspects related to Urban Construction in India” in New Delhi. Around 40 scientists and employees from the Government and industry took part in this workshop.

In April 2013, Mr. Anselm Kröger-Vodde, Head of Team PV Monitoring, Fraunhofer Institute for Solar Energy Systems ISE, was in India to conduct a half-day workshop at FIT academy on “Quality Assurance for Photovoltaics (PV) Power Plants,” which was attended by industry leaders. Fraunhofer in collaboration with SEMI India also organized an exclusive roundtable discussion involving senior executives and academicians from the solar energy sector on August 02, 2013. The theme of the discussion was “Strategies and Technologies for Solar Energy in India.” Dr. Roland Schindler of ISE shared the best practice examples on solar energy technologies across the globe. He was also invited as a keynote speaker at Solarcon India 2013 Conference.

Mr. Franz-Josef Wöstmann and Mr. Michael Heuser from the Castings department, Fraunhofer IFAM who visited Chennai, Pune and Delhi this year as part of business meetings, technology days and workshops, had several discussions with existing and potential automotive clients. Mr. Wöstmann said, “I was very pleased to see during my visit that we could discuss with our Indian partners at an equal footing. E-mobility and the components development for power trains are some areas which afford great possibilities for a mutually beneficial cooperation. I also see the possibility to combine different topics such as vehicle development and infrastructure in the future. The possibilities of collaboration between India and Fraunhofer Institutes; with the application-oriented work of Fraunhofer and the agility of Indian companies are transferable to all industry categories.”

The India office also organized visits to various Fraunhofer Institutes for senior management teams of its Indian clients. In January this year, an Indian delegation comprising of researchers from agricultural universities and industries visited the Fraunhofer Institute for Electron Beam and Plasma Technology FEP, Dresden. The University of Agricultural Sciences, Bangalore is showing keen interest to expand its cooperation with the Institute. The University organized its 8th National Seed Seminar in Bangalore between June 08-11, 2013 and Mr. Frank-Holm Rögner, Department Head, Electronic Beam Processes was invited as the speaker to this event. Currently a Memorandum of Understanding (MoU) and plans for joint research work are also underway to review the efficiency of this electron beam treatment for various types of seeds and soil conditions in India. Fraunhofer FEP, a few years ago, developed this environment-friendly method which frees seeds from pathogens such as fungi, bacteria and viruses.



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Several technology days were organized for a number of Indian clients at their facility and this was attended by Fraunhofer experts from Germany. Industry partners and Fraunhofer Institutes like IFAM, ISE, IPT and IWU have greatly benefitted through this and have often resulted in long-term collaborations.

Enabling access to affordable healthcare

The Open Innovation Healthcare Center (OIC) in Bangalore is the first of its kind to harness open innovation for affordable and digitally enhanced healthcare services. The Center was launched on October 30, 2012 by Professor Hans-Jörg Bullinger, Member of Senate, Fraunhofer Gesellschaft alongside the inauguration of Fraunhofer India. Dr. Wido Menhardt, CEO, Philips Innovation Center, Bangalore and Dr. Sabine Brunswicker, Fraunhofer Institute for Industrial Engineering IAO, Germany were also present during the inauguration and underscored their mutual interest in development of such a Center.

The OIC kick-off workshop was held at the FIT academy on April 17, 2013. The workshop witnessed participation from a diverse audience comprising of senior representatives from healthcare industry, hospitals and academia. The discussion helped to identify major healthcare issues like affordability, simplification of health management systems, public health and service benchmarking. The Center has planned several activities and conducts various meetings to ensure the achievement of its objectives and with the continued support of its participants, it hopes to excel in the area of digital and collaborative innovation in healthcare services.

Strategic collaborations with Indian partners

In May 2013, ISE signed a MoU with Ministry of New and Renewable Energy (MNRE), Government of India in Berlin in the presence of Smt. Sujatha Singh. The cooperation focuses on research, demonstration and pilot projects in the areas of photovoltaics, solar thermal and hydrogen. Similarly, a MoU between CSIR-NAL and the Fraunhofer Institute for Nondestructive Testing IZFP was also signed this year for mutual cooperation in the field of aeronautics. Cooperation in the areas of embedded systems and software engineering between Tata Consultancy Services (TCS) and the Fraunhofer Institute for Experimental Software Engineering IESE was enabled through a MoU signed between the two organizations in June 2013. Fraunhofer is also in the process of finalizing a MoU with BHEL for cooperation in a broad range of areas which are of mutual interest.

Forthcoming activities in India

- Dr. Andreas Sterzing, Fraunhofer IWU to speak at TERI-BCSD's 'Leadership Summit for Sustainable Development' in Mumbai - October 29, 2013
- Fraunhofer and International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI) 3rd MultiJoin Workshop in Indian Institute of Science (IISc) and Fraunhofer Representative Office, Bangalore - November 27-29, 2013
- Fraunhofer to present its Light-weighting Competencies at TATA Light-weighting Conclave in Pune- December 05-06, 2013
- Fraunhofer to participate in IMTEX Forming 2014, Bangalore - January 23-28, 2014
- Fraunhofer to participate in 12th Auto Expo 2014, New Delhi - February 06-09, 2014
- Fraunhofer Direct Digital Manufacturing Conference (DDMC) 2014 on Additive Manufacturing - March 12-13, 2014 – <http://www.ddmc-fraunhofer.de/>



“Synergies between IFAM and Indian market possible in different categories”

Mr. Franz-Josef Wöstmann who heads the department of Casting Technology and Components Development was in India recently on a weeklong visit for business meetings and conducting technology days and workshops with prominent Indian automotive clients. Excerpts from his interview:

Why India Mr. Wöstmann? Where do you see the synergy between the competencies of Fraunhofer IFAM and the Indian market requirements with respect to applied R&D?

India is a very complex country with various industry sectors, in which Fraunhofer does research and development. I visited various automotive OEMs and Tier-I automotive suppliers who constitute the main clientele group of Fraunhofer. The processing structure shows many parallels to Germany, but has its specific conditions for India.

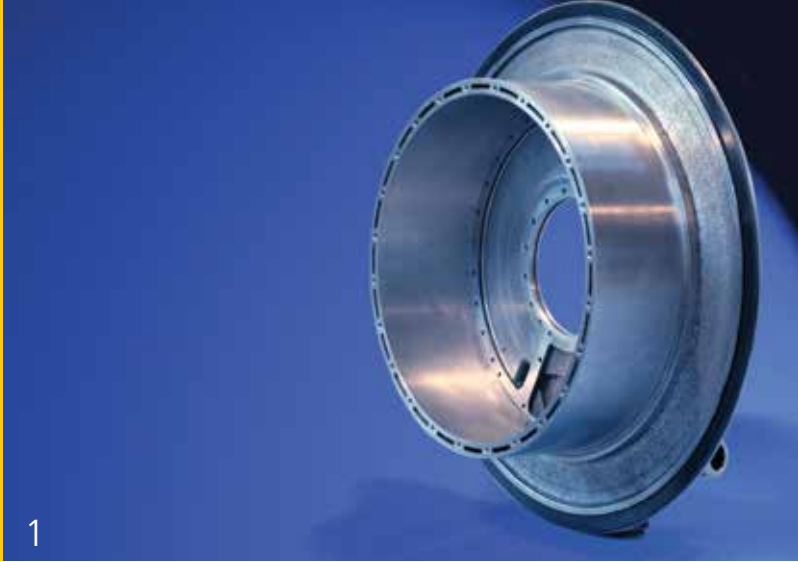
Synergies between Fraunhofer IFAM and the Indian market are possible in different categories. Firstly I want to mention the Foundry Industry, where I see the possibilities for cooperation from process management via material and process development to components development and their assessment. Various other skills of Fraunhofer IFAM such as battery technology development, adhesive and joining technology and coating or powder metallurgy can also be interesting for the Indian industry. In battery technology, some joint activities are already being implemented.

What are the exciting technologies of IFAM, particularly in castings that could be of interest to India?

There are several possibilities for collaboration in casting technology. I was glad to see that small and medium-sized businesses in India have analogous structures as German businesses. This enables an exchange between the businesses and can possibly be the basis for joint projects with several associates on one topic. I see possibilities in the areas of employee training, process stability, quality control as well as component and mold design, to name a few.

For large scale industries which develop their own products, I see possible collaborations in the areas of process optimization and new process and product development. One main topic in future against the background of globalization can be labeling of components with Radio-Frequency Identification (RFID), to ensure comprehensive tracing and quality control of each component. The Indian automotive industry will especially be interested in development of castings and hybrid components

The Fraunhofer Institute for Manufacturing Technology and Advanced Materials (IFAM) was set up in 1968 as a working group on Applied Material Research and incorporated as an Institute in the Fraunhofer-Gesellschaft in 1974. The Institute employs about 530 people; of this more than 91 percent is in the scientific technical area. With its core competencies “Shaping and Functional Materials” and “Industrial Bonding,” the Institute counts among Europe’s biggest neutral and independent research facilities.



for conventional and electric cars. These include development of electric machines, body components and total vehicle integration up to power control.

During your visit, you had an opportunity to meet automotive majors as well as SMEs from the automotive clusters. What kind of cooperative model do you suggest for these two groups?

One of the main differences between large scale industry and SMEs on the subject of a possible cooperation is certainly the budget for their own developments. Generally SMEs do not have a wide range of resources for in-house development. From my experience in Germany and other European countries, there is an alternative in the form of cooperation projects. I am sure this would be applicable in India as well. In this kind of project, several companies merge with stakeholders and define common interests which enable them to bundle capacity and budget. SMEs gain more freedom to operate and also get Governmental support for these projects. Firstly, I would like to build cooperation with stakeholders of SMEs and then work out a long-term plan.

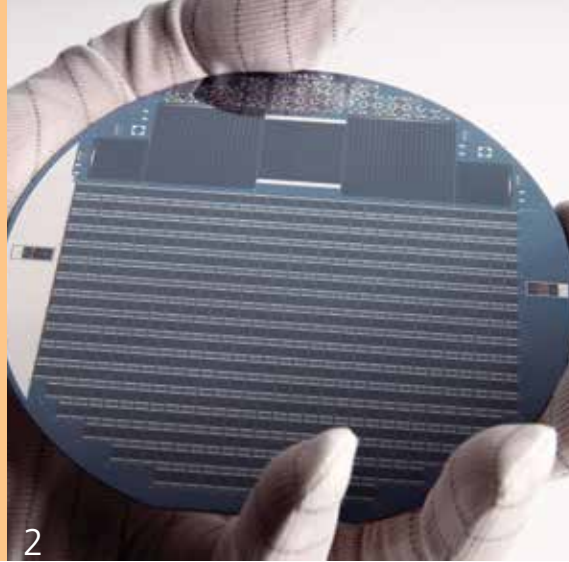
For large scale industries with international orientation, it is better to establish a bilateral cooperation wherein medium and long-term projects can be carried out to solve specific product and process related issues.

What is your action plan to engage with India in the future?

Firstly, I would like to know more about the companies I visited in India and develop solutions to the problems which were presented to us. I would also look into a stronger involvement and networking of the stakeholders in the SME sector. It is important for me that companies get to know and understand the competencies of Fraunhofer. Moreover, we also need to get an insight into the needs and questions of our Indian partners in order to develop specific solutions. This can be achieved with the support of Ms. Anandi Iyer, Head of our Representative Office in India.

It is also important to reach out to large scale industries with an aim of understanding their specific needs and thus realize bilateral projects in the field of applied research. To achieve this, we are going to increase participation in trade shows and exhibitions in India. My visit in August showed me that India is a country full of vitality and lot of potential for the future and that we can learn a lot from one another to shape the future together. I am looking forward to my next visit this December!

1. Cast housing with integrated water jacket and cooling ducts made for an electric motor in the lost foam process. © Fraunhofer IFAM



Fraunhofer Spectrum: New & Emerging Technologies

Smart Farming – Software makes harvesting cleverer

The challenges for future software engineering lie in the effective interconnection of real-world objects with digital services, sensors, and mobile devices. Collaboration between cross-system technologies does, however, not only bear great potential for new functions and services, but also new risks – particularly in terms of data security and dependability. The Fraunhofer Institute for Experimental Software Engineering IESE is therefore developing new processes and concepts intended to ensure safety and security for interconnected systems and better data usage control. So-called “Smart Ecosystems” integrate information systems, embedded systems, and mobile devices. This allows providing innovative and high-quality services in the “software ecosystem” – something a single system would not be able to do on its own. “Smart farming” – one example of a smart ecosystem – is exhibited at the newly established “Living Labs” of Fraunhofer IESE in Kaiserslautern. These illustrate showcases for innovative software engineering, for instance, how to enable the interaction of farming equipment in a safe and reliable way or how to protect data across system boundaries.

More creativity in post-production

In the throng of the film set, camera operators have to determine the camera angle, the aperture, and the depth of the camera field. Researchers at the Fraunhofer Institute for Integrated Circuits IIS have developed a new camera technology which will be able to change these parameters, even in post-production. An algorithm combined with a new type of camera array – i.e. an arrangement of several cameras – should enable these changes to be made retroactively in the future – and thereby allow for more creativity in post-production. Filmmakers can then still decide afterwards which area of the scene should be portrayed sharply. Or move around within a scene – virtually – like in the film Matrix. The actor is frozen in the scene, hanging motionless in the air, while the camera moves around, capturing the scene from all sides.

Direct Semiconductor Wafer Bonds for Next-Generation Solar Cells

In June 2013, Fraunhofer ISE announced its collaboration with EV Group (EVG) to develop equipment and process technology to enable electrically conductive and optically transparent direct wafer bonds at room temperature. The new solutions based on EVG’s recently announced ComBond® technology, aims to enable highly mismatched material combinations like gallium arsenide (GaAs) on silicon, GaAs on indium phosphide (InP), InP on germanium (Ge) and GaAs on gallium antimonide (GaSb). Direct

1. “Smart farming” - One of the examples of IESE’s smart ecosystem

2. ISE and EVG’s III-V multi-junction concentrator solar cells on 4-inch diameter wafer. ©Fraunhofer ISE

3. IFF’s “Wheelinspector” that makes direct non-contact measurement of light-alloy wheels in the production process. © Fraunhofer IFF



wafer bonding provides the ability to combine a variety of materials with optimal properties for integration into multi-junction solar cells, which can lead to new device architectures of unparalleled performance.

Quality Control in the manufacturing cycle

Researchers at the Fraunhofer Institute for Factory Operation and Automation IFF have created the “Wheelinspector,” an in-line compatible system for 100 percent inspection of vehicle wheels without contact. Up to 80 geometric features, such as radial and axial run out, width and diameter, relevant to vehicles wheels’ function are inspected before they are launched into the market. Normally, the wheels are inspected randomly with tactile measurement and under laboratory conditions away from the production line – for instance, in a room adjacent to the production floor. This procedure takes up to approximately 45 to 60 minutes per wheel, thus making it impossible to inspect 100 percent of the wheels produced. Defects and their causes are detected and rectified only with some delay. The “Wheelinspector” measurement system consists of four sensors and a complex system of axes for moving and positioning the sensors during measurement. This guarantees high flexibility; the system can inspect a wide variety of products in the same machine – even when regularly switching between different types of wheels.

Precision measurement of metallic foils during production

The Fraunhofer Institute for Laser Technology ILT is unveiling its new “bd-2” sensor for thickness measurements. Within a measurement range of several millimeters, the system can accurately measure foils, rolled strips and other metallic semi-finished products with a precision more than 100 nm. The small sensor head coupled with high-speed data processing facilitates inline measurements in the production line. Materials and quality control must meet increasingly stringent requirements in the aerospace and automotive industries. To provide thickness measurement, for instance, sensors must now be accurate down to the micrometer range yet nonetheless operate in the production line as fast as possible and with minimal maintenance. The innovative optical thickness measurement system “bd-2” (for bidirectional measurements) was developed to meet these requirements. The technology is based on the interference properties of semiconductor laser sources.

Building more sustainable aircrafts

The European Aviation Industry has set ambitious environmental protection goals for itself: by the year 2020, it not only wants to reduce emissions of gases harmful to the climate – carbon dioxide by 50 percent and nitrogen oxide by 80 percent – but it also wants to improve the life cycles of the aircrafts themselves. Life Cycle Assessment (LCA) is the term experts use to describe the systematic assessment of the adverse environmental impact of aircraft components in use. Researchers at Fraunhofer Institute for Building Physics IBP have now developed a computer

4. ILT’s new “bd-2” thickness measurement system based on bidirectional sensors. © Fraunhofer ILT, Aachen

5. Airbus production hall in Hamburg: using the “Eco-Design Software Tool.” © EADS

6. Aircraft production at Airbus. Autonomous robots will also be used in equipment production in the future. © Airbus-Military

7. A tablet PC being used to access and visualize data planning during a liver surgery. © Fraunhofer MEVIS /Fabian Bimmer (GERMANY)



Factories of the future: Mobile manipulators for aerospace production

The factory of the future is now coming to the aerospace industry. To help it along the way, a consortium made up of European Research Institutions and industrial partners is developing mobile and autonomously operating robots. These robots will help the assembly of aerospace components and work hand-in-hand with humans on the production floor. This project called "VALERI" was initiated and now coordinated by Fraunhofer IFF in Magdeburg, Germany. Together with their industrial partners, Airbus Military, FACC, IDPSA, and KUKA Laboratories GmbH, and their research partners PROFACTOR GmbH and PRODINTEC, the robotics specialists want to make their vision a reality. VALERI stands for "Validation of Advanced, Collaborative Robotics for Industrial Applications." Within three years, the consortium plans to develop applications and test mobile robots that will later be integrated into the production of aerospace components.

program with which environmental impact of aircraft components can be taken into account even at the design stage, during the R&D stage and before production begins. This "Eco-Design Software Tool" is based on an aviation database containing LCA-based environmental information on a host of reference components. With one click the designer knows how large a component's environmental 'backpack' is, based on its prior production process. This means that the related material and energy flows can be quantified.

Tablet PC supports Liver Surgeons - New app from Fraunhofer MEVIS

Until now, surgeons had to memorize the precise location of important blood vessels in organs and where tumours could likely be found and need to be removed. A new app for tablet computers developed by Fraunhofer Institute for Medical Image Computing MEVIS in Bremen could support surgeons and help them reduce the rate of complications during operations. This app is based on the established MEVIS software for liver operation planning that is employed in clinics worldwide and has been used for more than 6000 patients. Based on 3D X-ray images, the software can reconstruct the locations of blood vessels in the liver for each patient. Before commencing an operation, surgeons can precisely plan how and where to place the scalpel to most effectively remove a tumor. On August 15, the surgical team at the Asklepios Klinik Barmbek in Hamburg successfully tested this app during a liver operation.

Artificial Cornea - International Award for researcher of Fraunhofer IAP

Dr. Joachim Storsberg of the Fraunhofer Institute for Applied Polymer Research IAP was awarded the "Translational Research Award in Cornea and Ocular Surface Science." At its General Assembly in Nice in September 2013, the "European Association for Vision and Eye Research" (EVER) honoured the scientist for the development of the artificial cornea. The ArtCornea® implant can save the vision of people who are affected by corneal diseases or damages. It has been successfully tested in laboratory and animal studies and coalesces well with the natural cornea transplant. It is also suitable as a simple replacement for patients who would tolerate a donor cornea. It is easily implantable and does not cause critical immune responses.



©Fraunhofer ITEM

Clinical research trials at Fraunhofer ITEM

In the recent years, the incidence of allergies and airway diseases leading to various complications are on rise due to industrial activities that contribute to air pollution. Hence, there is a need for a substantial research to elucidate these disease mechanisms and improve the therapeutic options.

With its experienced team of pulmonologists and allergologists, nurses, physicists, medical laboratory technicians, and biomedical documentation officers, the Department of Clinical Airway Research of the Fraunhofer Institute for Toxicology and Experimental Medicine ITEM carries out controlled studies in healthy volunteers and patients with airway diseases. Its core projects involve early clinical studies for registration of drugs (phases I-II), treating respiratory tract diseases (asthma, chronic bronchitis, hay fever), studies on issues of environmental respiratory medicine, and development of novel methods for airway research. State-of-the art pulmonary diagnostics as well as the complete range of allergy diagnostics are established in this Department. Bronchoscopic examinations and non-invasive collection of sample materials from the lungs are also the focus of the Department's research activities. During clinical trials, data is collected using the validated electronic data acquisition system called ClinBase™.

The Department also features facilities that include three special challenge chambers known as Fraunhofer Environmental Challenge Chambers (Fraunhofer ECC) of 40 m² each. These are among a very few technical facilities present worldwide. Under controlled allergen challenge conditions, the efficacy of novel medications, for example, to treat seasonal allergic rhinitis can be tested. These chambers also enable researchers to conduct reproducible challenges with controlled levels of inhalant allergens, temperature and humidity for several hours. All the studies at the Institute are carried out in close cooperation with various departments of the Hannover Medical School and are performed according to the highest quality and safety standards approved by an independent ethics committee.

Fraunhofer ITEM is one of the few Institutes in the world that offers research and development ranging from the molecular level up to clinical trials all under one roof. For more than 30 years, the Institute has conducted research activities and services in occupational and environmental toxicology, clinical drug research and development, allergy and asthma research to name a few. Research on aspects of human health is also one of the Institute's main focuses.



“India is fascinating with strong economic growth”

Prof. Dr.-Ing. Eckhard Weidner, Director, Fraunhofer UMSICHT talks about India’s tremendous research opportunities.

Why India? How do you estimate the economic potential of the Indian market for your Institute?

India is a fascinating country with a strong economic growth story and amazing demographic dividend. Many markets for diverse technologies are developing rapidly. However, the high growth rates also carry infrastructure deficits which may hinder the same. Our Institute is working in the fields of energy and environmental technologies. India needs technologies in both these fields to conquer its present challenges and to be able to grow at the same pace in the future too. The technological support through Fraunhofer UMSICHT in this respect can be in many ways. It can cover the entire spectrum from pure contract research to strategic partnerships or joint ventures.

Contract research is in its infant stages in India. How do your partners react to proposals from your end?

It is indeed true that contract research is not very prevalent in India. It could be difficult for a European research organization with comparatively higher salaries and cost structures, as compared to their Indian counterparts, to get contracts in India. However there is a huge interest for cooperation, and in fact for our “ready technologies and products,” we are often contacted by Indian companies. There are also several enquiries from companies that want to distribute our products. One way of cooperating could be through the platform of the Indo-German Science and Technology Centre, which supports and funds New Product Development through funding by the German Federal Ministry of Education and Research as well as the Indian Ministry of Science and Technology. Of course, companies can contact us directly for technology transfer. In this case, we would enter into a licensing agreement with the respective Indian companies.

Could you draw benefits for yourself personally as well as for your Institute from your recent visits to India?

For me personally, the huge potential and the need for large investments and engagements in technology in India, are very motivating factors to engage with India on a long term basis. We believe we can make an impact on the quality of life through such interventions. For example, we can help to increase the agricultural production by 30% through the introduction of cooling systems. This kind of leapfrogging effects can hardly be imagined in developed countries.

Breakthrough in electricity storage

As a pioneer for technical innovations in the fields of energy, processes and products, Fraunhofer Institute for Environmental, Safety and Energy Technology UMSICHT aims at advancing sustainable economies, environmentally friendly technologies and innovative approaches. The Institute has been actively involved in developing cutting-edge technologies for the future to address global energy challenges. For instance, they have recently made an important breakthrough with their development of a redox flow battery that reaches stack power up to 25 kW, with a cell size of 0.5 m².



Fraunhofer UMSICHT scientists succeeded in increasing size and power of the battery stack by rethinking its design. © Fraunhofer UMSICHT



“OUR ASSOCIATION WITH FRAUNHOFER OPENED NEW CHAPTER IN INDIAN THERMAL SOLAR FIELD”

India has great potential to generate electricity from solar energy and is on course to emerge as a solar energy hub. India has targeted 20GW of Solar Power by 2022 in its Jawaharlal Nehru National Solar Mission (JNNSM). In an interview with Fraunhofer, Mr. Sampath talks about the scope, potential and challenges involved in running a business in the solar energy segment. Mr. Sampath also talks about VSM Solar’s cooperation with Fraunhofer and how it had benefitted them in India.

Why Solar is the best energy solution for the future?

Conventional energy sources have their serious draw backs. Petroleum based energy has carbon foot print concerns and also this resource is depleting fast and may not be available after a few decades. Nuclear energy has serious safety concerns and the future depends on renewable resources. Wind, though is a major renewable energy source, has its limitations as it has location constraints. Bio gas, geothermal, ocean waves and multitudes of other sources have their limitations and are not expected to grow leaps and bounds. With recent technological advances, we are now able to produce highly efficient solar collectors which cost less and require less space. The government is also encouraging the solar energy sector by offering incentives to propagate solarisation. Hence solar energy, with its abundance, has the potential to become the largest source of energy in the years to come.

If you can state one major challenge which is faced by this sector in India, what would it be?

The major challenge is to make this product acceptable in the market due to higher initial investment costs. Steps should be taken to bring in awareness among potential investors about the futuristic implications, social responsibilities and the idea of payback while investing in this sector. Banks should also come forward to fund projects and governments should pass investor-friendly policies to bring in more development in this sector.

How does your association with Fraunhofer benefit your business?

Fraunhofer offers expertise in the field of solar thermally driven steam jet ejectors and solar thermally driven absorption chillers. Both types of machines can be powered by solar thermal heat as well as by waste heat. In addition, the abundant solar energy in India provides high potential for energy supply. Fraunhofer UMSICHT was involved in the planning, erection and commissioning the solar cooling plant, and for the instruction and advanced training of the employees. This has enabled VSM Solar to gain the necessary technical know-how to establish a successful business in the solar energy sector in India.

VSM Solar Pvt. Ltd. is a joint venture company with 25% equity participation from Fraunhofer, Germany, set up in Bangalore. VSM Solar’s association with Fraunhofer has opened a new chapter in Indian thermal solar field. Mr. Srinivasan Sampath, the CEO and Managing Director of VSM Solar is an engineer and management professional with 35 years of experience in the areas of refrigeration and air conditioning, auto ancillaries, lighting, portable generators, glass, plantation and breweries.

PROFILE: FRAUNHOFER

Fraunhofer-Gesellschaft

Fraunhofer has been active in India since the past several years, bringing innovative technologies and research competence to India. Fraunhofer offers applied R&D services in various fields such as technology, textiles and new materials, aviation, aerospace and ICT. Ms. Anandi Iyer heads the Fraunhofer Office in India. Based on her network within Fraunhofer, she makes innovative technologies accessible to our Indian clients which include several top Indian companies and establishes strategic partnerships with Indian research and trade organizations. The Fraunhofer-Gesellschaft is a recognized non-profit organization that takes its name from Joseph von Fraunhofer (1787-1826), the illustrious Munich researcher, inventor and entrepreneur.

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The Fraunhofer Advisory Council in India consists of Indian and German industry leaders, who are practitioners in innovation and research. This pool of experts meets at least two times a year to guide, mentor and catalyze Fraunhofer activities in India.

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