

TDB MoUs Fueling iNNOVATIONS



edit

From Secretary's Desk

Commercialization of research leads is crucial to complete the Product Development Cycle. With more than 1000 research institutions covering almost all developmental sectors of economy, India abounds in idea generation, researching, publishing the research findings and creating enough spaces for productisation. The Indian Government while fully supporting the research agenda has now impatiently started looking forward to the returns on "research investments" in terms of indigenous products, import substitution, and solving major social issues challenging the country by integrating science with solutions. For a country as diverse and complex as India, the challenge is even more daunting because of the sheer size of its population and perpetually increasing demands.

Innovation & Startup culture revamped by the Government has **started paying the dividends**. Many Unicorns have emerged and consumer-led commercial enterprises have given **surprises** to economists and social scientists on their predictions and modelling. Finding funding support, mentorship and handholding at the right juncture is embedded in the outcomes. At TDB, we have made consistent & a determined efforts to reach out to young & promising technopreneurs; and providing assurance on technical and monetary fronts. TDB has assisted them in maturing their technology, selling these; and stabilising the enterprise to survive the onslaught of market dynamism.

In this issue of TDB News, we bring to you the inspiring stories of fourteen such ventures, supported by TDB in 2016-17. The ventures range from defence, artificial intelligence, green energy, electric mobility to vaccines & diagnostics. A snapshot of the Technology Day Awards 2017, in the presence of Hon'ble President of India, conveys that TDB recognizes excellence in individuals and organisations for contributing to the technology upscaling and commercialization. I am sure you would enjoy being part of us while reading the same.

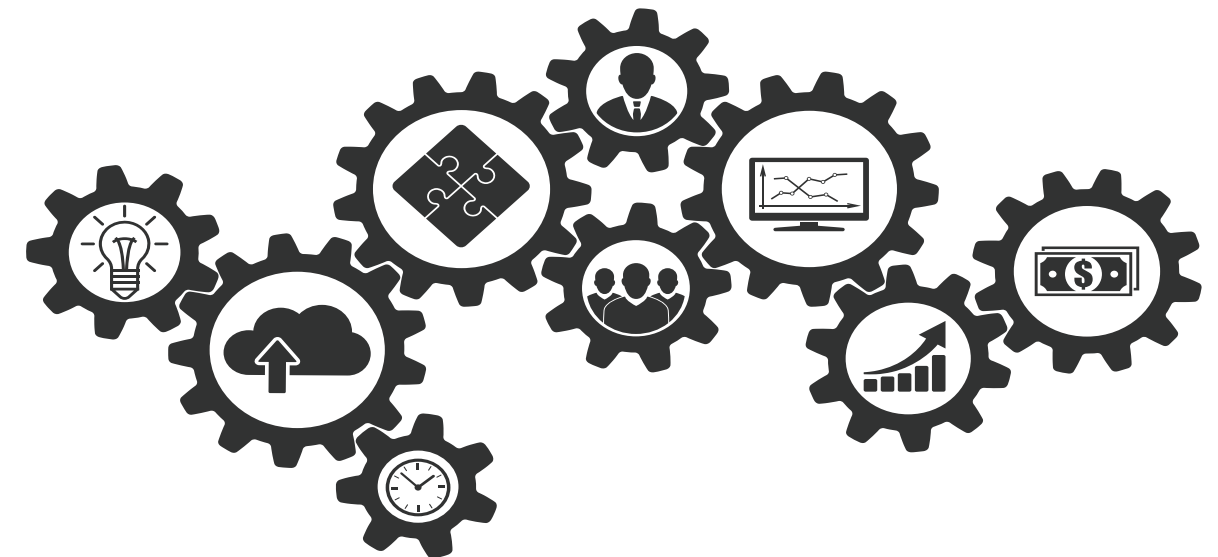


Bindu Dey
Secretary
Technology Development Board

MoUs Signed in by TDB in year 2016-17

Moving Technology Forward

Technology Development Board's primary mandate is centered around providing equity/other financial assistance to industrial concerns and other agencies attempting development and commercial application of indigenous technology or adapting imported technology to wider domestic applications and for matter connected therewith or incidental thereto.



Technology Development Board (TDB) has been financing technology development projects across various sectors enhancing the capability and confidence of new-age entrepreneurs especially in taking risks. With focus on soft loan @ 5 % simple interest and/or equity, TDB has evolved as a mature and unique promoter of first generation inventors over the years, in contrast to Public or Private sector banks who are generally risk-averse on such enterprises. Complimenting the Prime Minister's vision of "Make in India initiative", TDB has been supporting commercialization of innovative technologies.

With this objective, TDB aims to generate 1000 project proposals each year and, after evaluation, fund at least 100 in all sectors of economy. Currently,

the focus has been on defense, medical devices, cyber security, electric mobility, agriculture, green energy and pharma & biotech, textiles, infrastructure etc. Through its online application submission, TDB is endeavoring to cut-short the project-processing time and also mentor the startups/other early stage companies on technical and financial aspects. TDB outreaches to the public through repeated "Call for Proposals" on ideas that are pertinent in the current technology ecosystem.

Through this issue of TDB Newsletter, we share with our audience the Memoranda of Understanding signed during the year 2016-17 thereby playing a useful role in nation's quest for technological advancement and self-reliance.

in this issue

- | | | | |
|----|---|----|---------------------------------|
| 2 | Edit | 11 | Terminus Circuits |
| 3 | TDB MoUs : 2016-17 | 12 | Renalyx Health Systems |
| | Moving Technology Forward | 13 | Energos Technologies Pvt Ltd |
| 4 | List of agreements | 14 | Iatome Electric |
| 5 | Ampere Vehicles Pvt Ltd | 15 | DiabetOmics Medical |
| 6 | Panacea Medical Technologies | 16 | Systemantics India |
| 7 | Sonodyne Technologies | 17 | Sanvita Bio-technologies |
| 8 | Biological E Ltd | 18 | Sahajanand Laser Technology Ltd |
| 9 | TATA Power Company Strategic Engineering Division | 19 | Celebrating Innovation |
| 10 | SoftTech Engineers | 22 | Technology Day Awards |

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List of agreements:

S. No.	Project	Company	Agreement signed on	Total Project Cost (₹ crore)	TDB's Assistance (₹ crore)
1.	Indigenized development and commercialization of key components such as Motor, Charger, Controller, DC-DC Converter for Electric Vehicles	M/s Ampere Vehicles Pvt. Ltd, Coimbatore	15 th July 2016	6.91	2.43
2.	Commercialization and Setting up of Manufacturing Line for Indigenous Medical LINAC	M/s Panacea Medical Technologies Pvt. Ltd., Bangalore	6 th October 2016	19.30	7.40
3.	Commercialization of Fiber Laser Systems	M/s Sahajanand Laser Technology Ltd., Gandhinagar	13 th October 2016	24.53	6.40
4.	Specialized Digital Audio Hardware Solution for Residential and Professional Audio Segments	M/s Sonodyne Technologies Pvt. Ltd., Kolkata	7 th December 2016	16.24	5.00
5.	Manufacturing Facility for Pneumococcal Conjugate Vaccine	M/s Biological E Ltd., Hyderabad	8 th December 2016	320.39	100.00
6.	Development and Commercialization of Foot-and-Mouth Disease (FMD) Vaccine for Veterinary Use	M/s Sanvita Biotechnologies Pvt. Ltd. Hyderabad	9 th December 2016	101.18	16.00
7.	Setting up of Defence Manufacturing Facility at 50 acres Land at Vemagal Industrial Area, Kolar District, Karnataka	M/s Tata Power Company Limited, Strategic Engineering Division (Tata Power- SED), Bangalore	17 th December 2016	385.00	109.00
8.	Development and commercialization of Rule Buddy products (erstwhile "Arcita")	M/s SofTech Engineers Pvt. Ltd., Pune	6 th February 2017	6.15	2.45
9.	Commercialization of High speed serial link products	M/s Terminus Circuits Pvt. Ltd., Bangalore	16 th March 2017	20.79	9.70
10.	Development of an affordable connected Hemodialysis Machine for Rural Public Health Centers	M/s Renalyx Health Systems Pvt. Ltd., Bangalore	16 th March 2017	11.99	4.00
11.	Changing Energy Habits	M/s Energos Technologies Pvt. Ltd., Mumbai	23 rd March 2017	6.55	2.25
12.	Development and Commercialization of Portable X-ray machine	M/s latome Electric India Pvt. Ltd., Coimbatore	28 th March 2017	5.36	2.04
13.	Manufacture and Commercialization of Novel, Innovative, point of care, diagnostic tests for monitoring of Diabetes	M/s DiabetOmics Medical Pvt. Ltd., Hyderabad	28 th March 2017	25.77	5.00
14.	Design, Development & Manufacturing of Industrial Robots	M/s Systemantics India Pvt. Ltd., Bangalore	31 st March 2017	8.20	4.10
TOTAL				958.36	275.77

Indigenized development and commercialization of key components such as motor, chargers, controllers and DC-DC converters for Electric Two-Wheeler Vehicles

Ampere Vehicles
COIMBATORE

The two-wheeler market in India is growing rapidly even though there are serious challenges faced by the industry. These include fuel prices, currency fluctuations and carbon footprint. Already there has been a 200% increase in prices of petrol over the past decade. Rupee-USD exchange volatility is also a major variable as almost 80% of the oil imported by India is denominated in USD terms. Research has highlighted the strong links between automobile usage and global warming. Thus, the automotive industry is ever on the lookout for suitable alternatives to petroleum based vehicles. Electric Vehicles (EV) have emerged as a promising option in this quest. Although EVs have been around for quite a while, it is only in the last decade that they have been recognized as a plausible alternative to petrol based vehicles.

Electric Two-Wheelers (eTW) have a highly modular architecture. Over 65% of the cost of materials of an eTW is attributable to four main components – Battery, Charger, Motor and Controller. Reliability of these components is critical to durability and success of EVs. The battery and charger combined together contribute over 40% of the vehicle cost. The biggest reliability issues faced in Electric Two wheelers are from the combination of these two components. However, the manufacturing eco-system for these key components and their supply is at a nascent stage. This hinders the growth potential of EV industry in the country.

Ampere has been working towards technology development for the four key components of the EV power train with an ultimate goal to achieve 100% indigenization to reduce costs, improve product quality, contribute to



process efficiency and achieve manufacturing competitiveness.

Ampere came across the opportunities and facility offered by TDB during a road show conducted by TDB to sensitise stakeholders and also to attract high quality project proposals. The roadshow also allowed TDB to know more about Ampere and its core competencies.

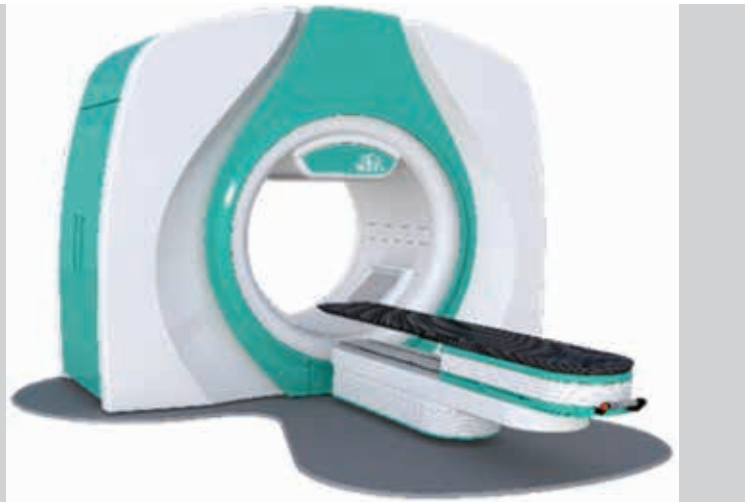
Ampere has gained tremendous knowledge in the area of Battery and its charging and are already manufacturing 36V Charger for E-Cycles and 48V to 60V chargers for E-Scooters. It is progressively creating completely indigenized High Quality DC motors and controllers.



Ms. A. Hemalatha
Founder and CEO

Commercialization and setting up of manufacturing facility for indigenous Medical LINAC

Panacea Medical Technologies
BANGALORE



Radiotherapy (RT) is a sophisticated technology for curing and controlling cancer. Linear Accelerator (LINAC) is a specialized RT machine that creates photon treatment beam having very high energy and is used to treat all tumor sites of the body. With the advancement in technology of LINAC, the survival rate has been improved by 5 years from 39% to 54%. Medical LINAC programme

is hence a priority for the Government of India. Being technology and capital intensive, medical LINAC is manufactured by only a few global players.

Panacea Medical Technologies had been working along with Bhabha Atomic Research Centre (BARC), India for

the development of indigenous technologies for Radiotherapy. Panacea realised that the rising burden of cancer has also increased the country's dependence on high-priced imported machines leading to a substantial hike in the treatment costs which is often unaffordable for a large section of the population.

With a passion for innovation and its goal to offer an alternate to high cost machines, Panacea embarked on the journey of manufacturing a state-of-the-art, reliable and affordable treatment solution. To do this it acquired medical LINAC technology from Society for Applied Microwave Electronic Engineering and Research (SAMEER) and developed Siddharth II, a 6MV LINAC with advanced radiotherapy delivery techniques such as Intensity Modulated Radiation Therapy (IMRT), Image Guided Radiation Therapy (IGRT), Volumetric Modulated Arc Therapy (VMAT) and Stereotactic Body Radiation Therapy (SBRT). The machine has unique features and offers precision surpassing the current market trends, while keeping the cost low.

With an estimated total demand for these machines to be more than 4000 by year 2020 (according to International Atomic Energy Agency), Panacea is uniquely positioned to compete against the major global manufacturers of medical LINAC by launching a full feature-loaded 6MV LINAC machine at a lower price.

Under the TDB funded project, Panacea intends to commercialize this 6MV LINAC to not only meet the huge unmet needs of patients in India but also tap the huge export market in various Asian, African and European countries.



Mr. G.V. Subrahmanyam
Co-founder, MD and CTO

Specialized Digital Audio Hardware Solution for Residential and Professional Audio Segments

Sonodyne Technologies
KOLKATA



India is one of the largest consumers of electronics in the world and there is a burning need to promote local manufacturing of electronics. The country has a large requirement of high quality audio not only in consumer electronics, but also in professional set ups like cinema halls, studios, auditoriums, retail, hospitality. Importantly, the back-end of audio now is IT and audio creation and reproduction is digital. In the consumer space the smartphone is now the data carrier and the professional spaces also have digital media creation and broadcast.

Sonodyne has been designing and exporting specialised audio products for over four decades. Company's expertise in the field of high quality audio design and manufacturing lends them a perfect launchpad to cater to the growing Indian and export market needs.

Audio equipments equipped with digital interfaces have the advantages of reduced noise and hum pick-up, no distortion or frequency response roll-offs, and less cabling. Hence amplifiers and active speakers now have to have digital inputs. In addition, automatic or user-controlled equalisation for correcting room response problems are being demanded by the recording engineer in the studio and the home theatre installer. Sonodyne has always focussed on high performance products and has pre-empted the movement of digital audio which will allow the high-quality audio equipment to effectively interface with the digital audio ecosystem in both residential and professional applications. In 2010, Sonodyne received a grant from Department of Scientific and Industrial Research (DSIR) to implement the project "DSP based high-end powered speakers" with DSIR contribution of 40% and company contribution of 60%. With the prototyping thus done, it was time to scale up manufacturing and marketing.

Sonodyne approached TDB for financial assistance for launching the prototype already developed into the market.

In the current project Sonodyne intends to scale up manufacturing and marketing operations so as to address the growing needs of specialised digital audio equipment in India and abroad. In this quest Sonodyne is adding 10,000 sq.ft. of factory space and procuring new machinery. Under this facility, a range of new products shall be introduced in the professional and residential audio spaces. Around 30 new models shall be launched, in phases, and the products shall be displayed/demonstrated in international trade shows in countries like Germany, Netherlands and USA.



Shri A.K. Mukherjee
Founder

Setting up manufacturing facilities for Pneumococcal Conjugate Vaccine

Biological E
HYDERABAD



Infections from *Streptococcus pneumoniae* are the leading cause of childhood pneumonia, meningitis, ear infections and bacteremia. The pneumococcal conjugate vaccines (PCV) approved for use in children are effective against ~70% of pathogenic *Streptococcus* strains encountered globally. In India, the vaccine is currently not a part of the general immunization program and is available in the private markets only at a prohibitive cost.

corporate strategy to enter complex vaccines with a social impact. The PCV developed by BEL is prepared by covalently linking purified polysaccharides from different etiologically important *Streptococcus pneumoniae* serotypes, to a carrier protein, namely CRM197. Known to efficiently trigger protective immune response in the vaccinated subjects CRM197 is established as a carrier protein to provide boostable immunity in children below 2 years. It is produced by a non-toxicogenic strain of *Corynebacterium diphtheriae* C7 strain, engineered in-house to increase CRM197 yield. The vaccine composition is unique as it contains polysaccharides from 14 serotypes of *Streptococcus pneumoniae* having the highest propensity to cause respiratory diseases in children. The 14-valent vaccine formulation offers broader protection than the ones available in the market (13 and 10 valent conjugate vaccines). The product has been developed through in-house research. BEL has filed two process patents for vaccine composition and polysaccharide purification.

Under the TDB funded project, BEL is setting-up a manufacturing facility with sufficient capacity to cater to the Indian and emerging markets. The company initially plans to produce ~25 million doses which will be eventually scaled-up to 100 million doses annually. Scaling up the capacity would also ensure affordability of the vaccines for the masses. BEL has an R&D strength of 300 people, employed in various locations and projects. For the current project, ~ 100 full-time personnel are involved. The team consists of highly talented scientists who have experience of working in various foreign and Indian companies. The company has successfully completed the Phase I clinical trials and the Phase II trials are under way.



Ms. Mahima Datla
Managing Director

Biological E Ltd (BEL), throughout its history has been a company that has invested in challenging projects with a social cause. Seeing the dire need of affordable PCV in India and other emerging markets, BEL conceived this project in the year 2014 as a part of its

Setting up a Defence Manufacturing Facility at 50 acres Land at Vemagal Industrial Area, Kolar District, Karnataka

TATA Power Company
Strategic Engineering Division
BANGALORE



For close to four decades, the Tata Power Company Ltd., through its Strategic Engineering Division (Tata Power SED), has been a leading private-sector player in the indigenous Mission Critical Defence Systems of strategic importance partnering with Ministry of Defence, Armed forces, Defence Public Sector Undertakings & Defence and Research Development Organisation. Integrated operations of Tata Power SED at Mumbai and Bengaluru are accredited with ISO 9001:2008 and successfully appraised for CMMI DEV L5 v1.3. Tata Power SED has been a torch bearer of developing Indigenous Technology in the country, thus retaining all doctrine related information strictly within the company. Launchers, Electronics for Thermal Imaging Sights, Secure OS and Trusted Platforms, MBT Arjun FCC and Hull Electronics are also few more efforts towards developing Indigenous products.

Continuing its commitment to India's Self-reliance agenda, Tata Power SED decided to expand its capacities and capabilities. Company's investment project at Vemagal, (Kolar, Karnataka) is a part of Make in India regime for developing private sector capabilities in India for manufacturing defence products with state of art facilities and technologies.

Spread over 50 acres of land at full capacity, Vemagal Project is a modern state-of-the-art Innovative Strategic Engineering Manufacturing Facility. It is one of the largest private sector investment in Defence Sector in India. Facility will be utilised for execution of orders in hand as well as in pipeline and repeat orders from the Indian Ministry of Defence which are planned to be delivered in future. This automated factory will contain the infrastructure and equipment to

manufacture, assemble and test PCBs, Electronics Modules, Mechanical Structures and sub-systems for Launchers and Shelters etc. including System Integration and Environmental / EMI-EMC testing compliance for Mil / Industrial specifications.

The Vemagal Project is now in the final stages with major civil works completed. The required machineries are either under installation or are expected to be delivered soon. The Commencement of Commercial Production is planned for Oct-Nov'18.

The company plans to move the production of all its major products to Vemagal. This includes rocket and missile launchers, integrated electronic warfare systems, fire control systems and technologies for battlefield management systems and tactical communication systems.



Mr Rahul Chaudhry
CEO

Development and commercialization of RuleBuddy products (erstwhile “ArchiTx”)

SoftTech
Engineers
PUNE



Upto date knowledge of complex and frequently changing rules and regulations is of utmost importance for construction industry. Builders and project consultants can greatly benefit from a product that helps them to quickly and reliably ascertain development control rules applicable for a project before the project design is finalized. This helps to avoid late stage changes in architectural plans

(to comply with the regulatory requirements) which involves waste of time, money and creativity. A single stop digital platform that can answer queries regarding latest building bye laws, fees for approvals/ processes etc. is the need of the hour.

SoftTech has been innovating reliable and world class software products for the niche segment of Architecture Engineering and Construction (AEC). SoftTech realized the difficulties of builders and project consultants and thought of coming out with a cloud based portal with all SMAC technology based features.

To address the issue SoftTech has proposed a web based application named as ‘RuleBuddy’. RuleBuddy provides all the rule and process related information from Urban Local Bodies (ULBs) across India on a single platform, which is not only digitally accessible but also offers various result oriented services. RuleBuddy has a robust rule engine, already mapped for 500+ ULBs across India. It facilitates professionals to get access to rules, fee calculation and processes of various ULBs across India. No other application or solution is available in the market to digitally access regulatory information and provide guidance in the construction domain.

TDB had earlier provided support for another SoftTech product - Auto DCR, an e-Governance solution for ULBs for building plan scrutiny process. AutoDCR has subsequently won several national and international awards for streamlining building plan scrutiny process in governing bodies. Motivated by its past successful collaboration with TDB, SoftTech approached TDB for financial assistance for taking RuleBuddy to the market and was successful in satisfying TDB’s rigorous scrutiny of potential partners.

With TDB support the team at Softech started work on the project in July 2016 and hopes to commercialize RuleBuddy by June 2018.



Mr. Vijay Gupta
Founder and CEO

Facility built up for project: Commercialization of High Speed Serial link products

Terminus
Circuits
BENGALURU



In the digital world, it is critical for a country to develop assets like fast computing servers, networks and storage systems. This necessitates building the state of the art High Performance Computing (HPC) systems to address the bandwidth and latency issues of Real Time Analytics, Digital India, Single Board Computing (SBC) etc.

Terminus Circuits has focussed upon design & development of high speed serial link products. In its quest to be the market leader in communication IP products, Terminus Circuits has developed solutions and technologies to address the throughput and latency issues related to HPC systems. It has licensed its bundled solution to its customer. With complete ASIC solution from Terminus Circuits, a Network-on-Chip (NOC) built with highest throughput/ lowest latency as a part of building a platform which is modular and scalable for Dynamical Exascale Entry Platform (DEEP). This 1 TB/s throughput with ~650ns latency NOC chip is silicon proven and in production at the customer’s site.

Terminus Circuit’s products play an important role in building HPC systems. The Network-On-Chip (NOC), PCIe 4.0, USB Gen2, Multi-Std SerDes, PCIe Retimer products are vital components for the projects of National Importance like NSM (National Supercomputing Mission), SBC (Single Board Computing), Storage device (PCIe Gen4 based SSD with NVMe controller), USB based display connectors etc.

TDB appreciated the importance of developing these niche, innovative and futuristic products in India and extended financial support for their scaleup and commercialisation to Terminus Circuits. Terminus Circuits wants to be ahead of market and catch up with the latest/ upcoming interface standards by PCIe-SIG, USB.org, IEEE etc. The company has a core team of 18 members with average experience of 7+ years. All the products have been designed, developed and manufactured by Terminus Circuits. The post Silicon activities that are needed to be outsourced abroad are in progress.



Dr K S S Reddy
Managing Director

Development of an affordable connected Haemodialysis Machine for Rural Public Health Centres

Renalyx Health Systems

BENGALURU



required resources limits further expansion of dialysis treatment facilities.

Dialysis machines and consumables are currently imported leading to high cost of dialysis treatment. Availability of kidney related diagnostic, therapeutic and management facilities in rural areas is another challenge that cannot be ignored.

Renalyx has developed an affordable, internet connected dialysis machine to cater to the rural ESRD patients. It consumes less power compared to the ones in the market and can be supported by solar power. The first version will be a fully functional dialysis machine. Renalyx is developing a water generation technology to reduce the water consumption drastically. The subsequent versions will have the provision to reduce the consumption of water which is around 120 liters at present. Unique features of Renalyx dialysis machine are as follows:

- Centralized Dialysate Distribute System
- Remote monitoring module
- Intuitive user interface for ease of operation

Renalyx approached TDB for funding their project and found that every key objective of TDB is aligned with Renalyx's vision of providing affordable and accessible healthcare solutions. With its strong team of scientists, technocrats and doctors, the company has manufactured 2 units for clinical trial which are undergoing bench testing at this moment. Clinical Trial is expected to be conducted in February 2018 and commercial launch is expected to be in June 2018.

In India, diabetes and hypertension today account for 40-60% cases of Chronic Kidney Disease (CKD). Unlike diabetes and hypertension, CKD is detected only in the End Stage Renal Disease (ESRD) where the patient already needs dialysis or kidney transplant.

Over 15 lakh individuals suffer from ESRD, with about 70,000 patients undergoing dialysis. This is just about covering 5% of total number of patients. High cost of equipment, lack of easy accessibility and shortage of



Dr. Shyam Vasudevarao



Dr. Lloyd Vincent



R M Kishin Gandhi

Changing Energy Habit

Energos Technologies

MUMBAI

The world is facing serious environmental challenges. One big problem in India lies in the energy sector where energy generation is either through fossil fuels or renewables, each with its own drawbacks. Apart from a depleting resource, fossil fuels also mean release of CO₂ in the atmosphere.

Renewable sources have the drawback of high maintenance and limitations of favorable weather conditions for energy generation. An effective way to deal with the problem is by practicing energy efficiency with available energy, irrespective of the source.

Enterprises today are willing to invest in energy efficiency. The main challenge is to make it financially viable and percolate best practices to all stakeholders. Another challenge is to measure real time impact and to achieve efficiency along with practicing energy sustainability. Energos *Digital Energy Sustainability* platform makes it easier than ever before enterprises to achieve this.

'Energos Edge' is an intelligent self learning universal cloud based application capable of automating any air conditioner in the world. It connects people to air conditioners in a unique relationship which encourages responsible behavior by users, leading to 20% in energy cost reduction and corresponding reduction in CO₂ emissions. Compared to installing the new 5 star rated and energy efficient marked air conditioners available in the market, Energos Edge provides similar impact & outcomes at a



fraction of the costs. It can also help resolve load shedding by creating opportunities for users to voluntarily reduce demand for power when not needed by routing it as saving and storage of energy at distribution level. Energos has helped reduced 20000 tons of CO₂ emissions and has achieved 12,700 trees offset till FY 17. The technology has been patented and has won numerous industry awards. Energos started with their initial projects in year 2015 and now has a pan India presence with solutions deployed at more than 1000 locations.



Mr. Rajesh Solanki (First from Left) Founder CEO with his team.

Development and Commercialization of Portable X-ray machine

Iatome
Electric
COIMBATORE



Majority of medical diagnostic X-ray equipment available in India is based on traditional 50Hz line frequency design. Apart from being an outdated technology, they are bulky, fixed and need dedicated electric power for operation. Light weight equipment with imported components are expensive and difficult to maintain.

Iatome Electric, Coimbatore has expertise and product knowledge in high voltage and X-ray generation. The company has developed its own

indigenous technology for x-ray generation. Using this technology, the Iatome Electric has developed innovative X-ray products such as a hand-held-battery operated X-ray machine. These new and compact X-ray sources are more efficient, feature rich and affordable. Company has received several awards including one from Government of India for commercialisation of their technology. It has also received an innovation award from Medcall for its handheld X-ray machine.

The key technologies required and developed at Iatome Electric are high frequency x-ray generation, composite insulation, digital control of x-ray generation, innovative high voltage packaging and battery source. Resources are needed not only for R&D but also setting up manufacturing facility, purchase of raw materials and marketing.

The initial investments were pooled in by the founders and relatives. However, it was clear that more would be needed if designs and concepts have to reach the market. Iatome Electric's request for financial support from TDB covering 4 types of X-ray machines and parts was approved and loan agreement signed in March'2017. Apart from funding, TDB's positive attitude instilled a new confidence in the company with regard to its ideas and plans. The products supported by TDB are in various stages. A 4kW lightweight mobile X-ray is in pre-production while the hand-held battery operated x-ray is in full production. The OEM Fluoroscopy generator for C-Arm equipment is in prototyping stage.

Iatome Electric sees opportunities in this field as apart from medical field, these designs have application in security, industrial imaging and analytics as well.



Mr. P. K. Uthamachandran
Managing Director



Mr. Biju S Nathan
Principal Engr. & Director

Manufacture and Commercialization of Novel, Innovative, Point-Of-Care Diagnostic Tests For Monitoring Of Diabetes

DiabetOmics
Medical
HYDERABAD

India is now considered as the global capital for diabetes with a burden of >90 million subjects. Type1 diabetes (T1D) is increasing prevalent and a larger number of mixed diabetes (T1.5D or LADA) go undiagnosed. T1D diagnosis in low and middle income countries (LMICs) is often in the emergency room as a complication of undetected severe hyperglycemia leading to decompensation of multiple systems. The current tools to detect T1D/T1.5D are laboratory based assays that are not accessible in LMIC setting, or, are cost prohibitive (>8,000 INR/test). Another issue is lack of availability of rapid point-of-care tests for pre-eclampsia and gestational diabetes suitable for LMICs.

DiabetOmics has developed a non-invasive saliva-based rapid point-of-care test for the detection and monitoring of Type 2 Diabetes (T2D). The rapid non-invasive test is designed to be low-cost and address important unmet clinical gaps in Diabetes monitoring. DiabetOmics has also developed rapid point-of-care tests for pre-eclampsia and gestational diabetes suitable for LMIC economies. Becton Dickinson, a global medical device company, has licensed DiabetOmics' pre-eclampsia and gestational diabetes tests for sales and distribution.

DiabetOmics' rapid tests will have a significant impact on early detection, prevention and accurate diagnosis to match personalized intervention; a road map to reduce economic burden of diabetes in LMIC. This effort is also supported by the Juvenile Diabetes Research Foundation, and new partnership with Helmsley Charitable Trust to deploy these rapid tests globally for early detection of T1D and intervention using new therapies.



High-capacity, world class manufacturing facility set up by DiabetOmics Medical at Hyderabad is expected commence commercial production shortly and will provide supply chain for global sales and marketing. DiabetOmics is committed to bringing new low-cost solutions to fight the global burden of Diabetes and maternal health complications. This sentiment is strengthened with development of a low-cost high-volume test strip and reader assembly facility. This effort is in-part supported by the TDB bringing innovation to its "Make in India" initiative.

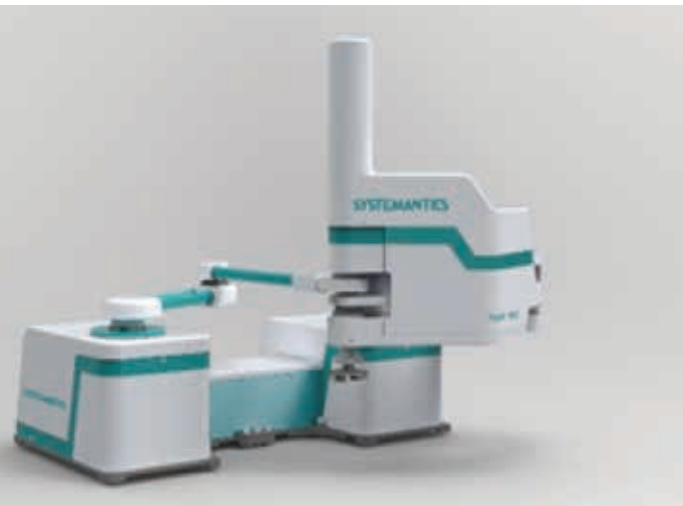


Left to right: Dr. Srinivasa Nagalla (President and CEO, Diabetomics), Dr. Sada Rao (Director, Indian Operations), Milena Christankova (VP, Marketing), Charles Roberts (VP and CSO) Dr. Paturi Rao (VP and CMO)

Design, Development & Manufacturing of Industrial Robots

Systemantics
India

BANGALORE



needs of an Indian shop floor with “Sensible Robotics” – a framework that offers world-class technology and design innovations that could change the paradigms for ROI as well as user experience. In line with its mission and the “Sensible Robotics” approach, Systemantics has 2 products: ASYSTR 600 and ASYSTR 400.

The product evolution started when an early prototype of the 4 axis product became demonstrable; and 6 axis product was in design phase. Systemantics was seeking funds to help commercialize technology for both, 4 as well as 6 axis products. This was the appropriate time for collaboration with TDB since it was at a stage where technology was ready to be morphed into a product.

Attractive terms and milestone apart, approach that TDB offers also played a part in sealing the partnership. TDB’s loan is purposed for developing technology for the product, creating an infrastructure for test and measurement to ensure functionality, quality and reliability, as well as creating tooling, jigs and fixtures for manufacturing readiness. Presently, the 4 axis product, ASYSTR 400 has been commercialized and the first unit sold. The 6 axis product, ASYSTR 600 is near completion and the first unit is likely to be shipped out in Feb. 2018. With TDB, Systemantics hopes to gain access to government departments and agencies once the technology is commercialized. In the long run, through its products and services, Systemantics hopes to impact the competitiveness of small and medium sector manufacturers by providing them an unprecedented flexible manufacturing opportunity.

Systemantics is an indigenous Industrial Robots maker Benaguru of Bangalore with a mission to drive widespread adoption of flexible automation. The Indian market is fragmented and flush with global robotic manufacturers, but bereft of indigenous players who can compete on a level playing field.

Systemantics has successfully produced for the first time a product that is *fully conceptualized, designed and manufactured in India*. The robot components are sourced from high-quality Indian component manufacturers and our manpower talent is sourced from India’s best

technology institutions. The company believes that its Make in India strategy gives it the edge in terms of addressing the



Harsha Lal



Jagannath Raju

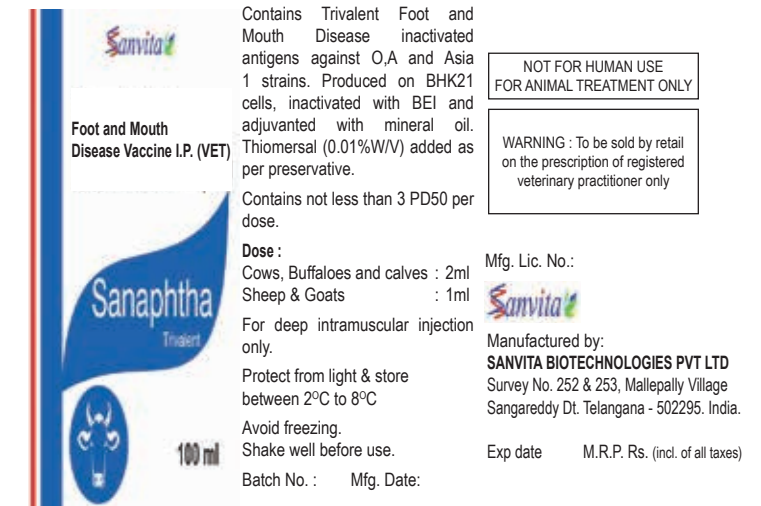
Development and Commercialization of Foot-and-Mouth Disease (FMD) Vaccine for Veterinary Use

Sanvita
Bio-technologies

HYDERABAD

Foot and Mouth Disease (FMD) is one of the most infectious viral diseases of milch animals like cattles and buffaloes which results in an estimated direct loss of more than Rs. 25000 Cr. It is a big issue on trade in livestock products for export due to FMD in India. Therefore, controlling the disease through vaccination is of national priority and importance towards its control/eradication to enter global livestock export market. The demand for FMD vaccine in the country is increasing as more and more animals are vaccinated under the FMD Control Programs (FMD-CP). During the last five years, country has used about 150 - 200 million doses of FMD vaccine per year. FMD vaccine requirements in our country during the 12th Plan period will be about 600 million doses per year due to increase in the areas for FMD control.

Sanvita Biotechnologies Pvt Ltd, Hyderabad is an affiliate company to M/s Vivimed Lab Ltd. Sanvita has been involved in setting up the facilities for production of veterinary and human vaccines by licensing technologies developed by Indian Veterinary Research Institute. It has been working on FMD disease vaccine and Brucellosis in animals for the last couple of years with an aim of commercialization. Under the TDB funded project, Sanvita is setting up a state-of-the-art integrated vaccines manufacturing and formulating facility for FMD vaccine. The facility will comply with WHO cGMP and safety norms. This facility will include a modern BSL3 compliant and comprehensive animal testing unit with features having dedicated incinerator, underground bio-waste collection and disposal systems. The innovativeness of the proposal is the reduced viral NSPs (Non Structural Proteins) contamination to undetectable levels



so that the FMD vaccine will be internationally acceptable and is also DIVA (Differentiation between Infected and Vaccinated Animals) compliant resulting in enhanced stability and potency. The project, apart from implementing the indigenously developed technology, will meet the social objectives by increasing life of live-stock and earnings to the farmers across the country. This feature of the project is socially relevant to public health and will play an important role in supporting the national program on “Control of FMD”.



Dr. V Manohar Rao, CMD, Sanvita Biotechnologies with Dr. Bindu Dey, Secretary, TDB on the occasion of signing of loan agreement.

Commercialization of Fiber Laser Systems

Sahajanand Laser
Technology Ltd.

GANDHINAGAR



low running costs. The capability to generate kilowatts of optical power and deliver it in a spot less than 10µm in diameter makes fiber lasers suitable for cutting, welding, micromachining, material processing, marking, and enables the development of new applications.

The aim of the project funded by TDB is in-house production of medium to high power 1 µm continuous-wave (CW) fiber laser sources at Sahajanand Laser Technology, Ltd (SLTL). The company is also aimed to build capability and infrastructure for in-house production of fiber lasers at SLTL Group to narrow the gap in products and prices between foreign and domestic suppliers, and thus enable not only cost savings but also access to better and timely services to domestic customers, which include both government & defense labs and commercial organizations. Sahajanand Laser Technology Ltd. (SLTL Group), a pioneer of fiber laser applications in India, has taken on the challenge of producing fiber laser sources. The project started in 2014 and is expected to be commercialized in March, 2018.

SLTL Group is the proud pioneer of Indian sheet metal industry's transformation. Indian subcontinent, South East Asia, Middle East, Russia, China, Europe, USA, Canada, and Latin America have become major markets for laser undertakings. Apart from business, SLTL believes in technical enlightenment and extends its knowledge base to scientific research institutes liberally. Highly experienced research scholars, laser specialists, engineers specialized in the fields of software, electrical, mechanical and instrumentation etc. are a part of SLTL's Research Group.

Cutting sheet metals is a basic process applied across innumerable manufacturing industries. Initially it was executed with CO2 laser machines. Though there were many other systems available for metal sheet cutting, like water jet systems, however the CO2 were considered more efficient. However, it came with challenges of high capital and operational costs, high import content, lack of application know-how etc.

Fiber lasers offer a competitive alternative to traditional lasers due to their superior performance, compactness, ease-of-use, and



Mr Dinesh Patel Mr Maulik Patel Dr Arvind Patel



CELEBRATING INNOVATION

With a variety of major technological breakthroughs associated with the date 11th May (nuclear tests at Pokharan, maiden flight of indigenous passenger aircraft "Hansa-3" and test firing of Trishul missile system), the day is celebrated as **Technology Day** to extol the quest for scientific excellence and technological creativity.

Technology Day is now an annual occasion to celebrate innovations, honour innovators and recognise successful commercialization of innovations to benefit the society.

Like last many years, a glittering ceremony was organized by the TDB on May 14, 2017 at Vigyan Bhavan, New Delhi to celebrate Technology Day 2017. The function was Attended by more than 900 S&T professionals from a wide variety of institutions across the country. Hon'ble President of India Shri Pranab Mukherjee was the Chief Guest at the event while Dr. Harsh Vardhan, Hon'ble Union Minister for Science & Technology & Earth Sciences presided over the function. Shri Y. S. Chowdary, Hon'ble Minister of State for Science & Technology & Earth Sciences was the Guest of Honor.

In his address at the occasion the Hon'ble President of India felicitated the scientists for their contributions to science & technology. The function was also an occasion to give away Technology Awards constituted by various S&T agencies of Govt. of India to encourage and recognise efforts towards development and commercialisation of technology by Indian scientists and agencies.

Technology Day Awards were given to selected individuals and institutions for their outstanding contributions to India's S&T landscape in terms of novel products and processes that have the potential to make a notable contribution to national development and societal welfare.



Dr. Harsh Vardhan
Minister for Science & Technology and Earth Sciences, Govt. of India, speaking on the occasion of Technology Day 2017

Dr. Harsh Vardhan, Hon'ble Minister of S&T and ES enumerated various achievements of the Government under the able leadership of the Hon'ble Prime Minister. He referred to the new formula **"IT plus IT is equal to IT or Information Technology plus Indian Talent is equal to India Tomorrow"** given by the PM. Underscoring the importance of adapting to new technologies and stay ahead of others, he stated **"While we applaud significant achievements in space, atomic energy, meteorology & biotechnology, we must also contemplate on whether the technological developments are limited to a few sectors, or are they all inclusive and encompassing, improving the lives of our vast population on a day-to-day basis"**.



Hon'ble President Sh. Pranab Mukherjee emphasized that **"Scientific and Technological developments are key to any nation's success, and nations harboring ambitions of self-reliance must strive to excel on these fronts. India is one of the top-ranking countries in the field of basic research. Indian science has progressed to become one of the most powerful instruments of knowledge. The achievement in the field of agriculture has been remarkable through use of modern & appropriate technologies during the year."**

He recognised the role of DST and its various agencies in fostering the development and commercialisation of indigenous technology for societal good and welfare.

Shri Pranab Mukherjee
President of India speaking on the occasion of Technology Day 2017



Sh. Y. S. Chowdary
Hon'ble Minister of State for S&T, speaking on the occasion of Technology Day 2017

Sh. Y. S. Chowdary, Hon'ble Minister of State for S&T and ES while addressing the Technology Day 2017 at Vigyan Bhawan opined that "realizing that innovation is the engine for national & global growth, employment, competitiveness and sharing of opportunities in the 21st century, the Government of India declared 2010-2020 as the Decade of Innovation". He suggested that "technological Innovations are needed in infrastructure, agriculture, energy, healthcare and education to have wider ramifications".

Prof. Ashutosh Sharma, Secretary, Department of Science & Technology welcomed the Chief Guest and other dignitaries. In his welcome address, he highlighted that innovation, incubation of scientific ideas in Technology Business Incubators and Start-up India as major contributors of the **"Make in India"** efforts.



Prof. Ashutosh Sharma
Secretary, Department of Science & Technology, speaking on the occasion of Technology Day 2017

TECHNOLOGY DAY AWARDS

In order to forge powerful partnerships with the National Laboratories, to create knowledge networks with academic institutions and to gain entry into global market, the Technology Development Board instituted a "National Award" for successful commercialization of indigenous technology by an industrial concern in 1999. These awards are given to the industrial concern that has successfully commercialized the indigenous technology along with the developer / provider of such technology.

National Award

For the successful commercialization of indigenous technology



NUMALIGARH REFINERY LTD. GUWAHATI

For indigenous development and commercialization of Wax De-oiling Technology: Developed jointly in collaboration with CSIR-Indian Institute of Petroleum, Dehradun and Engineers India Limited, New Delhi and commercialized by Numaligarh Refinery

National Award (MSME Awards)

For successful commercialization of a technology based product



PLUS ADVANCED TECHNOLOGIES, GURUGRAM

For development and commercialization of MiraCradle™



VIKARSH NANOTECHNOLOGY & ALLOYS PVT. LTD. PUNE

For commercialization of Nano Crystalline and Amorphous Ribbons

TECHNOLOGY DAY AWARDS

The second category of award introduced in 2001 for SSI Units which has been renamed as MSME Award for MSME's that has successfully commercialized a product based on indigenous technology.

From the year 2017, TDB introduced a new category of Awards to encourage & promote Technology Start-ups for development of promising technologies having potential for commercialization.

National Award For Technology Start-ups



BELLATRIX AEROSPACE PVT. LTD. MYSORE

For development of Microwave Electrothermal Thruster: An efficient electric propulsion system for satellites



PADMASEETHA TECHNOLOGIES PVT. LTD. CHENNAI

For development of MCAPD Device: A 'Wearable Alternate Kidney', for CAPD dialysis anytime/anywhere



NANOCLEAN GLOBAL PVT. LTD. GURUGRAM

For development of Nano-respiratory Nasal Filter: The first ever non inserted, hypo allergenic and self-adhering nanofiber based respiratory disposable nasal filters to guard against finest pollutants in the air thereby minimizing the risk of respiratory diseases



About TDB

The Government of India constituted the Technology Development Board (TDB) in September 1996. The mandate of the TDB is to provide financial assistance to the industrial concerns and other agencies attempting development and commercial application of indigenous technology or adapting imported technology for wider domestic application. The financial assistance from TDB is available in the form of loan or equity and/ or in exceptional cases, grant. TDB accepts applications for financial assistance from all sectors of economy throughout the year. TDB has also participated in Venture Capital Funds to wider its scheme for spreading support to technology oriented projects. Further, it also provides support to incubators through its Seed Support Scheme.



For further information, please contact:

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