

Annual News Letter published by Trivandrum Engineering Science and Technology Research Park

Trivandrum Engineering Science and Technology Research Park (TrEST) Campus to be moved to 50 acre campus at Vilappilsala



In an effort to improve the research capacity of the state, 50 acres of land will be allocated for setting up a dedicated campus for Trivandrum Engineering Science and Technology Research Park (TrEST) at Vilappilsala, adjacent to the APJ Abdul Kalam Technological University campus.

The new facility will comprise of industrial parks that would also enable

students, researchers, faculty and industries to collaboratively work on research projects, which can later be realized into startups.

The residents from Vilappilshala, welcomed the project with great enthusiasm as this would be one of the major development projects in the Rs 350 cr. township plan proposed by the Trivandrum Corporation.

MoU is being signed between K-DISC, TTPL, VSSC, C-DAC and TrEST Research Park



An MoU was signed between K-DISC, TTPL, VSSC, C-DAC and TrEST Research Park on the 24th of November, 2021 in the presence of Hon. Chief Minister Shri. Pinarayi Vijayan, Hon. Minister for Industries, Law and Coir Shri. P. Rajeeve, thus realising the EV -Consortium.

Hon. Minister for Finance Shri. K.N. Balagopal, Hon. Minister for Agriculture Shri. P. Prasad.

Hon. Minister for Higher Education and Social Justice Prof. R. Bindu, Hon. Minister for General Education and Labour Shri. V. Sivankutty were the other members who were present during the event.

Visit by 'Father Of Intel's Pentium Chip', Vinod Dham



Vinod Dham, also known as 'Father of Pentium Chip' visited Kerala on November 10, 2022.

During his meeting with Hon. CM, Shri Pinarayi Vijayan, he recommended

that a Centre of Excellence for Product Design should be developed and offered all assistance for its design. The govt. assured that that provision of necessary facilities for the project in Technopark would be considered.

The K-DISC EV Consortium among K-DISC, TTPL, VSSC, C-DAC and TrEST Park focus on the promotion of R&D in Electric Vehicle Power System components.



The activities of the consortium are planned in a phased manner where during the initial phase the consortium partners will engage in manufacture and research of battery components and electric drives.

In the later phase it is planned to leverage the research and start manufacturing battery cells and drivetrains and its allied components. The consortium proposes to utilize the funds from the State and Central Government agencies and also tap into the investor base in the State.

Netrasemi receives award for Semicon India FutureDesign: DLI Startups



Jyothis Indirabhai, CEO of Netrasemi receiving award from Union Minister, Shri. Rajeev Chandrasekhar

Union Minister of State for Entrepreneurship, Skill Development, Electronics & Technology, Shri. Rajeev Chandrasekhar announced Netrasemi, a startup incubated at TrEST Park, as the Semicon India Future Design: DLI Startup.

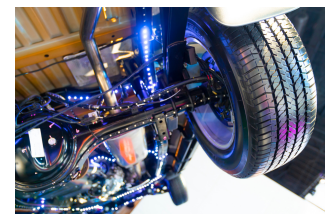
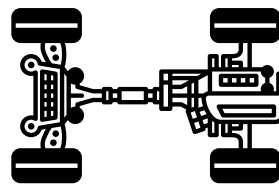
The announcement was made during the 3rd Semicon India Future Design Roadshow organised by the Ministry of Electronics and Information Technology in New Delhi on May 12.

Union Minister, Shri Rajeev presented the memento to Jyothis Indirabhai, CEO of Netrasemi.

Under the Semiconductor Design Linked Initiative (DLI) scheme, the startup will receive a grant of Rs 15 crore.

The Ministry has announced the Design Linked Incentive (DLI) Scheme to offset the disabilities in the domestic industry involved in semiconductor design in order to not only move up in value-chain but also strengthen the semiconductor chip design ecosystem in the country.

Drive Train Lab worth 15 crores to be set-up at TrEST Park



An MoU was signed with Tata Elxsi on 21 June, 2022 towards setting up the Drive Train Lab at TrEST Park. The lab, with the funding from K-DISC, in order to facilitate the development testing of Drive Train Systems developed in the country.

There will be significant investment required to set up the Drive train Testing Lab, which costs around Rs 15 crores, with Rs 8.5 crores for Low Voltage Lab and Rs 6.5 crores for High Voltage Lab.

Currently, there are only very few Drive Train Testing facilities in the country, the prominent ones being Automotive Research Association of India (ARAI, Pune) and The International Centre for Automotive Technology (ICAT) Delhi by the Government of India. With the growing interest on Electric Vehicle Technology, an increasing number of startups are focusing on the development of Drive train Systems, and they require drive train testing lab facilities.

In the first phase TrEST park aims at establishing capability for powertrain research and development along with suitable testing facility. Hence, we will concentrate on various technologies available in this domain and the topologies adopted worldwide.



TrEST Start-up Updates

1) Innovation eXperience: Engen

In a major step towards sustainability and saving environment, Innovation Experience, a startup from TrEST Park has set-up an innovative waste processing unit at Government High School, Chavadimukh.

The waste processing equipment, designed under the leadership of Mr. Shyam Kumar, who



The waste processing unit set-up Chavadimukh Govt. High School

is also the founder of ENGEN, can process food waste in a matter of 2 hours and later converted into manure in approx. 7 hours. The invention is affordable when compared to solutions available outside India.

The photo below shows the students showing the vegetables grown from the manure taken from the waste processing unit.



He aims to set-up the plant to all the Govt. schools of the state through CSR funds and support from the Kerala State Government.

First Feature Film shot using Solar Energy



'Aryabhata', the first feature film fully filmed using solar energy was inaugurated by MLA, Shri Kadakampally Surendran. The film shot by the team from Innovation Experience, a TrEST Park startup

2) TIERA

Tyrannus Innovative Engineering And Research Academy (TIERA) is a value-based engineering firm that does innovative and sustainable research. The applied research and innovation builds cost-effective and optimal solutions to real time problems making TIERA a one stop solution for all your T&M needs.

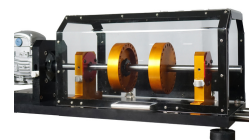
Latest Achievements and Activities

i. Grant

TIERA has secured a 12 lakh scale-up grant from the Kerala Startup Mission (KSUM). The TDAQ IEPE FFT Analyzer and TVIB software are the products of grant-eligible applied research. This initiative involves three PhD candidates from CET and one from NIT Trichy.

ii. New Products:

TIERA has launched the advanced Machinery Fault Signature Simulator (TMFSS) mini. VSSC, Lab3 (Australia), CIMCON software, Advantech, NITs, and others are among the customers. TIERA has also released the Phonovibe four-channel IEPE DAQ to the market.



3) Entuple

Entuple is a company that produces state-of-the-art electric powertrains and turbochargers, founded by technocrats with extensive experience building technologies for Aerospace and Defense applications.

They have a team of scientists and engineers leading an indigenous electric mobility revolution by developing cutting-edge technologies in traction motors, motor controllers, and ultra-high chargers. The company constantly works for the development of the R&D operations and exploration of the green future.

Latest Achievements and Activities

i. Grant

Entuple E-Mobility secures \$3 million Pre-Series A funding from Blue Ashva Capital and Capital A.



The funding supports the development of next-generation traction motors and drives for mobility applications, as well as machine learning and enhanced telematics capabilities in its products. In addition, it assists in enhancing the advanced technologies for OEM customers.

MoU with Government of Tamil Nadu

Entuple E-mobility signed an MoU with the Government of Tamil Nadu and is one of three new firms that will set up their electric scooter or EC powertrain manufacturing units in the emerging EV hub of Hosur-Krishnagiri-Dharmapuri (HKD).

ii. Events :

Auto Expo - Pragathi Maidan

Entuple will take part at the forthcoming Auto Expo at Pragathi Maidan. The event has received national news coverage from all major news organizations.

4) Trizlabz

Trizlabz is a start-up with a primary focus on bringing out best-in-class industry 4.0 technology-enabled products for multiple verticals. It promotes methodical research with continuous innovation by balancing the right proportion of youth energy and exposure to experience.



It employs value analysis and value engineering methods combined with design thinking to create market-fit products that are reliable, sustainable, and product-enabled services. The team works towards partnering with technology schools, and leading research houses to foster research and capacity building.

Latest Achievements & Activities

i. Indoor Autonomous Mobile Robot

Trizlabz is currently developing a prototype for an Indoor Autonomous Mobile Robot that can interpret the surroundings using sensors and AI-based technologies. The two robot models, Celer and Ira, with payloads of 200 kg and 25 kg, respectively, are designed to move and operate independently in different settings, including industrial, warehouses, resorts, and hospitals. The robot can perform tasks such as delivery, transportation, and inspection with great accuracy and efficiency since it can follow predetermined courses or instructions while identifying barriers.

Trizlabz plans to present a prototype demo for series funding by the end of January 2023 in light of the recent advancements in the AMR.

Trizlabz has applied for a patent, for the design of the robot's chassis

ii. Internships

Trizlabz now offers internship opportunities to 27 students (B-tech and M-tech) from SCTCE, Toc H, MEC, and CEAL, in the fields of mechanical design and analysis, path planning, sensor integration, and web design.

5) Augsense Lab

Introduction

Augsense Lab is a research company that fosters the human spirit of exploration. It transforms the concepts into industrial value creation. Through an extensive network of Universities/Institutes and Industries, Augsense Lab tries to bring about meaningful changes in India's academic and industrial landscape.



Achievements And Awards

i. Projects

a. Atmospheric Sensing Solution

The team is developing an atmospheric sensing solution that, by using real-time remote sensing of the atmosphere, has the potential to revolutionize weather sensing and forecasting for aviation.

b. NSonde

Augsense Lab is making progress in developing the technology for our first product line, NSonde. NSonde is a novel model that profiles the atmosphere for hyper-local weather sensing and accurate long-term and short-term weather forecasting.

ii. Grants

- This year, the Kerala Startup Mission is considering Augsense Lab for a research grant.
- The company secured a Nidhiprayas Grant to prototype the technology, with the support and partnership of Force Forge

6) Westghats Technologies

Introduction

Westghats is an intelligent edge computing technology provider focused on providing AI based smart vision solutions. They specialize in enabling high performance video analytics and AI capabilities to embedded devices with their unique architecture.

The company has a complete range of technologies to address challenging demands of next generation intelligent systems.

Current Activities

- Westghats is working on the development of AI solutions for smart cities, automotive and the defence sector.
- They have working prototypes of multiple AI platforms with edge-based use cases and a portfolio of embedded AI software solutions.
- Interacting with multiple customers in India and abroad
- Licensed silicon IPs to customers and signed commercial deals for royalties etc.

7) Netrasemi Pvt. Ltd.

Introduction

Company is focusing on smart vision platforms. Enables smart vision for defence and smart cities. Also incorporates advanced hardware security engines

Current Activities

- Netrasemi is working on the development of an AI neural processor chip with advanced Video analytics capabilities.
- They have a working prototype of their chip in FPGA and are building various IPs that are critical for the chip.
- They had completed SoC integration and getting ready for tape out.
- In the final phase of GOI's DLI eligible startup approval that allows up to 15 Crore INR incentives for building chips.
- They are also the finalists for GOI's C2S scheme (jointly with CET) that allows up to 4.5 Crore INR funding from MEITY for building chips. Netrasemi is committed to provide part-funding to CET of about 50 Lakhs.

MoU with KSCSTE and ACUTE, Hearing Aid Project

A project titled "ACUTE (Anacusis Curing Technology)" by Mr. Akhilesh R (Principal Investigator) successfully completed the prototype development under Phase-I and submitted a detailed proposal for assistance

for product development under Phase- II of the Youth Challenge Programme of KSCSTE.

KSCSTE has approved the project and agreed to provide financial support for developing the prototype into a commercial product. TrEST Park is the implementing agency.

MoU with SCTIMST

The business incubation unit of Sri Chitra Thirunal Institute of Medical Sciences and Technology, TIMED, has signed an MoU with TrEST Research Park, in order to promote awareness of IP and Technology Transfer, and also to facilitate collaboration between the startups / companies in TIMED and TrEST Research Park.



As part of this, TIMED will conduct some sessions on IP and Technology Transfer for the companies.

SCTIMST-TIMED organized an online session with the startups at TrEST Research park on 27th Oct 2021, where they interacted with TIMED CEO, Mr. Balram to discuss and understand the expectations by start-ups.

RISC-V Centre of Excellence

As an effort to build a semiconductor manufacturing ecosystem in Kerala, TrEST Research Park created fabless semiconductor lab, harnessing the talents available at College of Engineering Trivandrum (CET) and other institutions in state.



Following this, departments of EEE/EC/CSE of CET partnered with TrEST Research Park and

Westghats Technologies to build RISC-V processor chip and its associated tools. The objective of this project was to develop RISC-V processor chip and associated tool chain through participation between CET and Westghats Technologies under the TrEST ERC framework. M/s Westghats is a fabless semiconductor company developing hardware acceleration chipsets to enable edge computing for several high potential computer vision and AI applications. TrEST enables students, faculty and local industrial ecosystem to demonstrate an operational model that caters high-tech research participation.

By the end of 2021, M/s. WestGhats Technologies had created a RISC-V 32 bit bare metal processor in FPGA. The design was prototyped in FPGA and tested with a drone BLDC motor control in the lab. Now we are in process of releasing

RISC-V based EV ECU (FPGA) on an e-KART Project



The plan of incorporating the RISC V Processor developed in an e-KART, has extended the scope and TrEST has been taking all the required effort to bring faculty leadership to the execution of the project and to make sure that the Centre of Excellence is self-sustainable. An Electric Vehicle Processor with RISC-V Core which is under development at TrEST is designed with features which include: High speed DSPs, Algorithm accelerators, Parallel processing architectures, Advanced Multi-channel multi-mode DMAs, Tightly coupled memories, Special instructions, Floating point units etc. It is expected that this

system shall provide maximum energy transfer efficiency with minimizing losses due to heat, vibration and noise.

The development in EV has accelerated innovation and improved efficiency in electric motor controls and power conversion and battery management system. Our aim is to “Design an Electric Vehicle Using RISC-V Semiconductor Chip”. This includes designing and development of RISC-V Chip designing using the below functionalities.

- Communication Control
- Motor Speed Control testing
- Inverter Testing & BMS

Students from EEE/EC/AE are working on the project guided by faculty from respective departments. An MoU was executed on 1st October 2022 with M/s Netrasemi for the design and development of chip. The project is driven by faculty with support from Netrasemi team and is ongoing.

Electric Vehicle Conclave Series



The Kerala State Electric Vehicle Consortium, which is anchored by K-DISC (Kerala Development and Innovation Strategic Council), focuses on promoting the adoption of EVs in Kerala and developing an EV ecosystem in the state.

The consortium partners are Vikram Sarabhai Space Centre, Centre for Development of Advanced Computing, Titanium, and TrEST Research Park

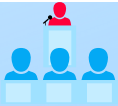
Recently, the consortium organized an Electric Vehicle Conclave Series, which is the first of its kind in the state. The purpose of the conclave was to bring together stakeholders in the electric vehicle industry, including manufacturers, policymakers, consumers, academia, and industry to discuss the latest developments in the field and to explore ways

to accelerate the adoption of electric vehicles in Kerala. The event also covered the current state of the EV industry in Kerala and the challenges that need to be addressed in order to encourage the wider adoption of EVs

TrEST Highlights

- TrEST set up two Centres of Excellences (a) Electric Vehicles and (b) Microprocessor chip development.
- Currently 9 companies have set up research units in TrEST Park in the AI based microprocessor chip development, EV, Vibration acoustics, weather forecasting and non-conventional energy sectors.
- Trained 40+ faculty members and 100+ students in ANSYS software.
- TrEST Park is a member of the consortium of KDISC, CDAC, VSSC, TrEST and Titanium for Battery related technology.
- TrEST Park has signed an agreement with KSCSTE for a core project @Rs.50 Lakhs funded by KSCSTE.
- TrEST Park is in dialogue with ANERT in the non-conventional energy sector.
- Infrastructure for EV and Electronic Research Centre, Centre of Excellences completed.
- More than 50 engineers are working in the research units.
- Nearly 500 students trained in design and simulation software by industry experts.
- Research units in TrEST have already acquired 2 patents and application filed for 2 more.
- Several papers have been published in international journals by researchers.
- Imparted training to 200+ participants on various physics of EV as part of TrEST initiative since July 2019.
- About 120 students and staff members of CET involved in various projects for R&D.
- Under ERC project, TrEST recruited 14 JRFs of which 10 have undergone rigorous training for 2 years under RISC -V chip designing one JRF have been absorbed by Netrasemi and two newly posted is undergoing the training.
- Extensive documentation was being made.

- Engineers at Westghats Technologies along with faculty and JRFs completed a detailed study of two popular RISC-V projects (PULPISIMO and PicoRV32) and were able to successfully integrate and prototype them on FPGA boards by enabling all the toolchains. An Electric Vehicle Processor with RISC-V Core is under development at TrEST.
- Have created TrEST e-School – a Youtube channel and Open Edx platform for MOOC courses.



Public Engagement



Interaction with dSPACE, a German IT based product company focusing in the automotive sector, and with students and faculty members @ Mar Baselios Engineering College

Session by FAYA:80 on Driving Disruption - Catching the New Wave of EVs



FAYA:80, a popular technology knowledge community hosted the first major meet-up since the outbreak of the pandemic in Technopark, Thiruvananthapuram.

These session was led by Shri. Koshy P Vaidyan, CEO, Trivandrum Engineering Research Park and Gautam ST, Director, Gyanoholic International.

The event saw around 280 participants which included tech enthusiasts, hobbyists, developers, project managers, and all others who would like to know about electric vehicles

Our Team



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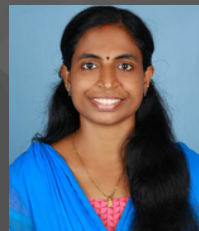
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