**Bharatiya Vidya Bhavan's**
**SARDAR PATEL INSTITUTE OF TECHNOLOGY**
Munshi Nagar, Andheri (W), Mumbai – 400 058.
(Autonomous Institute Affiliated to University of Mumbai)

# 3.5: Consultancy

3.5.1: Revenue generated from consultancy and corporate training during the last five years

Letter from the beneficiary of the consultancy along with details of the consultancy fee

## Contents

List of faculties who are having the consultancy in previous 5 years

| Name of the faculty consultant or trainer | Organization to which consultancy or corporate training provided | Dates/duration of consultancy | Amount generated in INR Lakh |
|---|---|---|---|
| **2022-23** | | | |
| Dr. Reena Sonkusre, Dr. R.R.Sawant, prof. Priya Deshpande | KPEC (smart energy meter) | 6 Months | 2,00,000 |
| Dr. Rajendra Sawant | Design and development of Digital Controller for Induction Casting Machine) DST fund | 1 Year | 70,20,723 |
| **2021-22** | | | |
| Dr. Rajendra Sawant , Dr. Y.S.Rao | General Auto Electric Corporation | 1 Year | 1,50,000 |
| Dr. Rajendra Sawant, Dr. Y. S. Rao | Sileaf Technologies, Pune | 1 Year | 2,00,000 |
| Dr. Rajendra Sawant , Dr. Y.S.Rao Dr. G.T.Haldankar | Riddhi Heatron | 1 Year | 1,00,000 |
| **2019-20** | | | |
| Dr. Pooja Raundale | Indian Daily Times Mumbai | 1 Year | 54,000 |
| Dr. Arti Karande | Smartly Built | 1 Year | 6,000 / student per month |
| **2018-19** | | | |
| Dr Rajendra Sawant, Dr Y S Rao, Dr Rajendra Sutar | HardCarb | 1 Year | 1,85,000 |
| Dr Rajendra Sawant | Suyog Telematics | 1 Year | 1,00,000 |
| Dr Rajendra Sawant | Zeuva Automotive Pvt. Ltd. | 1 Year | 1,00,000 |

KPEC
2,00,000/-
2022-23

Bharatiya Vidya Bhavan's
Tel : 91-22-2670 8520
2670 7440
2628 7250
Fax : 91-22-2670 1422

(Founded in 1938 by Kulapati Dr. K. M. Munshi with the blessings of Mahatma Gandhi)
ओम् आ नो भद्राः क्रतवो यन्तु विश्वतः ।
Let noble thoughts come to us from every side

SARDAR PATEL INSTITUTE OF TECHNOLOGY
( Autonomous Institute )
Bhavan's Campus, Munshi Nagar, Andheri (west), Mumbai - 400058, India
E mail: principal@spit.ac.in website: www.spit.ac.in

# Memorandum of Understanding

## 1.0 Introduction

This memorandum of Understanding (MOU) is signed on 21st February 2023 between: **KPEC Engineers & Contractors Pvt Ltd** with its principal place of business located at 502, Janki Centre Premises Co. op. soc. Ltd, Andheri west, Mumbai 400053 (the "Company" which term will also include its associate, holding and subsidiary group companies) hereinafter called as party of the FIRST PART And **Sardar Patel Institute of Technology**, Munshi Nagar, Andheri (West), Mumbai-58, a self-financed Engineering institute affiliated to Mumbai University and managed by Bhartiya Vidya Bhavan, a charitable trust, herein after called as SPIT as party of the SECOND PART.

**KPEC Engineers& Contractors Pvt Ltd** is in the business of providing engineering & contracting services in Electrical & Instrumentation field. Company works culture is based on the philosophy of innovation. First party has established Electronic Instrument contract manufacturing setup for innovative products eg Clean Air Monitoring system, Flyback LED Drivers up to 250 Watts, 250W Micro inverter, Smart Smoke Sensor for futuristic needs and to address specific issues in Pharma & Petrochemical Plants. The products are designed and manufactured to meet global standards. KPEC Engineers & Contractors Pvt Ltd products are appreciated for superior quality all over the world.

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**Sardar Patel Institute of Technology (SPIT)** is an AICTE recognized college spread over a campus of 47 acres and is an Autonomous College affiliated to the Mumbai University. It imparts various degree courses in Engineering and also certificate courses. SPIT aspires to be one of the premier R&D organization in the academic world. It is also involved in Research and Development in the area of Embedded Systems, VLSI design, Power Electronics, Software Technology and related areas of computer science. Its focus is to help create cutting-edge Technologies and offer advanced training for students, Government, and Industry.

KPEC Engineers& Contractors Pvt Ltd & SPIT felt that their collective expertise & teaming together can help explore new business avenues for the mutual benefit of both entities. Accordingly, KPEC Engineers& Contractors Pvt Ltd has approached SPIT for the teaming for the **Development of Smart Energy Meter for Residential, Industrial & Commercial applications.**

## 2.0 Alliance Objective

The scope of the MoU, the roles, and responsibilities of the parties of the MoU are given below:

1. KPEC Engineers & Contractors Pvt Ltd and SPIT will engage mutual cooperation in Research and Development primarily in the field of Embedded Systems, Instrumentation & automation, Power Electronics, Industrial Electronics, Communication and Computing.
2. KPEC Engineers & Contractors Pvt Ltd agrees to offer internship towards the student community of SPIT that is mutually beneficial.
3. Research and new product development activities and joint research projects to be undertaken, funding for which will be provided by KPEC Engineers & Contractors Pvt Ltd. SPIT will offer infrastructure, research, human resource, and laboratory facilities whenever necessary during current project.

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## 3.0 Current Project Statement & Prescription of the development work

**Title: Development of Smart Energy Meter for Residential, Industrial & Commercial applications.**

1. The development consists of Development of appropriate models of Smart Energy Meter as per Technical Specifications mentioned in Annexure I & Annexure II. SPIT will take complete responsibility which includes Identification, Study & Analysis to develop industrial grade Smart Energy Meter.
2. Study & evaluation of target board hardware, circuit schematics design philosophy, flowcharts, firmware literature provided by first Part.
3. Development of firmware in C/C++ for Smart Energy Meter based on latest MISRA C coding standards, testing of Smart Energy Meters as per Annexure II certification standards, along with assistance for NABL accredited Lab certification.
4. Testing of hardware (target boards prototypes housed in enclosure) for its performance on cloud-based server with SPIT developed firmware as per NABL testing procedures.
5. Study of various certification standards provided in Annexure II, Communication, carrying correspondence & visits to ERTL, Andheri or CPRI Bengaluru for guidance in testing of Smart Energy Meters. All Expense will be borne by first part.
6. Establishment of miniature testing Lab up to NABL standards in SPIT, all expense borne by first part by signing a separate MoU and agreement.

## 4.0 Methodology

1. Development of Smart Energy Meter in totality whose [illegible]s and but not limited to Technical Evaluation of Circuit Schematic, Design philosophy, Flow Charts pertaining to ATSAM4CMP16 microcontroller, W5500 Ethernet IC, RS232, RS485, MBUS, Protocols. Development,



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Testing of Firmware in C/C++ adhering to MISRA C coding standards, Development of firmware for System Clocks, RS-232, RS-485, TWI (EERAM, Temperature Sensor, Hardware Authentication IC), Watch Dog Timer, Reinforced Watch Dog Timer, 20 × 04 Character LCD (GPIO), Tamper Detect, RTC (peripheral on SoC), periodic timer and interfacing with W5500.

2. Communication with server using HTTPS + JSON – ReST API and/or MQTT-JSON ensuring secured communication using TLS1.3 Development of firmware to interface EMAFE using Microchip's energy metering library and validate the results.
3. Integration of various modules in the firmware to create modular application. Generate verifiable results on cloud.
4. Preparation of Testing and Calibration procedure as per Energy meter Technical specifications mentioned in Annexure I & Annexure II.
5. Documentation of testing procedures, testing results on various load conditions, & observation for pre-certification.

## 5.0 Milestones

1. This is a **Six months'** project having total three phases.
2. The **First Phase** is of **Three months** and executes following task:
   Study Energy Meter Technical Specifications Study of Design Philosophy, Flow charts, Circuit Schematics,ATSAM4CMP16 data sheet, Microchip Hardware Abstraction Layer API, IDE, W5500 datasheet, W5500 library and other datasheets, Study of Microchip's energy metering library Study of MISRA C coding standards Development of firmware for System Clocks, RS-232, RS-485, TWI (EERAM, Temperature Sensor, Hardware Authentication IC), Watch-Dog Timer, Reinforced Watch-Dog Timer, 20 × 04 Character LCD (GPIO), Tamper Detect, RTC (peripheral on SoC), periodic timer and interfacing with W5500.Communication with server using HTTPS + JSON – ReST API



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and MQTT-JSON with secured communication using TLS1.3 Development of firmware to interface EMAFE using Microchip's energy metering library and validation of the results. Integration of various modules in the firmware to create modular but tightly integrated application Generate verifiable results on cloud Designing and Assembly of mechanical enclosure.

3. The **second phase** would be of another **two month** required for:
   Preparation of Testing and Calibration procedure as per Energy meter Technical specifications mentioned in Annexure I and Annexure II. Documentation of testing procedures, testing results on various load conditions and observations for pre-certification. Smart Energy Meters prototypes should be able to pass certification test of CPRI Or ERTL so meetings, interactions or communications with certification agency is required. First part will bear expenses.
4. The **third stage** is a Final stage of **one month** duration utilized for:
   Only lab testing, testing for various load conditions simulated is responsibilities of SPIT, 1st part will bear expense for setting of miniature testing facility at SPIT. Preparation of report / design documents, etc. as per various test parameters. Handover of TOT documents.

## 6.0 Project Implementation and Commercials

1. The hardware material means, Development boards, Microcontroller based Printed Circuit boards, Display boards, Ethernet driver board, HF Transformer, Rogowski coil, CTs, Test Load, etc., SPIT team shall purchase discrete components at their end, as and when required in the consultation with KPEC Engineers & Contractors Pvt Ltd project-team and raise the necessary bill against the invoice submitted to KPEC Engineers & Contractors Pvt Ltd.

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2. The commercial software and webservices required for this project shall be exclusively will be borne by KPEC Engineers & Contractors Pvt Ltd as and when needed.
3. Testing can be done initially on local server and on successful POC, testing will be carried on cloud-based server arranged by first part.
4. SPIT team will hand over all the necessary data and Firmware files during TOT for future modifications, if any.
5. Smart Energy Meters prototypes should be able to pass certification test of CPRI Or ERTL so meetings, interactions or communications with certification agency is required first part will bear expenses.

## 7.0 Financial

1. All the hardware cost is included in the project except the test load, final testing facility and its related cost should be taken-up by KPEC Engineers & Contractors Pvt Ltd.
2. The total project development cost is Rs. 2,00,000/- including the cost of Institute services but excluding the Govt. taxes on the all the relevant heads of payment.
3. Stipend to the four interns on mutually agreeable terms on monthly basis can be given to SPIT students by KPEC Engineers & Contractors Pvt Ltd, maximum up to Rs 5000 per intern per month.
4. During the course of project, if there are some consultancy services needed on some specific tasks which is beyond the skillset of SPIT project team may be taken from outside agency and the outsourcing cost up to Rs 30,000 shall be paid by KPEC Engineers & Contractors Pvt Ltd.

**Payment Schedule:**

(a) Rs 25,000/-+ Govt. Taxes -at the start of the projects, at the time of signing MOU.

(b) Rs. 25,000/--+ Govt. Taxes -- after the completion of first phase of three months.

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(c) Rs 50,000/--+ Govt. Taxes on after the completion of Second phase phase of two months.

(d) Rs.1,00,000/--+ Govt. Taxes --after field trial and handing over the TOT documents etc.

***(All the payments should be made in favor of Principal, SPIT, Allied Division after signing an MOU between both the parties).***

## 8.0 Mutual Obligation

1. This MoU may be terminated by either party through a notice of one month. Either party may terminate this MoU if either of the parties is frustrated by reasons beyond its control from going ahead with the implementation of the provision of this MoU.
2. There shall be no liability on the part of any party to the other arising from the termination of this MoU.
3. This agreement may not be amended without the prior written consent of both the parties.
4. Neither party shall issue any press release, public announcement, or other such disclosure concerning this agreement without the other party's consent as to such release or announcement.
5. SPIT will sign a Non-Disclosure Agreement (NDA) necessitated to protect IPR and essential information safeguards from both sides.
6. SPIT team shall be free to employ external consultant on paid basis, if required, in specific circumstances to meet the strict timeline for project completion without violating NDA document terms and with no extra liability on the first party (KPEC Engineers & Contractors Pvt Ltd).
7. Intellectual Property Rights: IPR titles or ownership of any products, proprietary information or technology tools, processes, utilities, and methodology including any KPEC Engineers &Contractors' Pvt Ltd proprietary products or components thereof used hereunder or development of any deliverables and all new ideas, inventions,

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innovations, or developments conceived, development or made by KPEC Engineers & Contractors Pvt Ltd here under will not be transferred from KPEC Engineers Pvt Ltd to the Institute on account of use of the same as part of any work under this MoU and shall always remain with KPEC Engineers & Contractors Pvt Ltd.

8. SPIT will undertake Medical Insurance of persons working on development of Smart Energy Meter project &SPIT will take proper steps to avoid any type of danger to equipment's, material provided by KPEC Engineers & Contractors Pvt Ltd & persons working on development of Smart Energy Meter

**SPIT PROJECT TEAM:**

**Principal Investigator:**

Dr. Reena Sonkusare

Associate Professor and HOD, Dept. of EXTC

Sardar Patel Institute of Technology,

Munshi Nagar, Bhavans Campus, Andheri (W), Mumbai-58

022-26708520/2628 7250 (Ext: 382).

**Mob:** 8850287922

**Email:** reena_kumbhare@spit.ac.in

**Co-Principal Investigator:**

Dr. Rajendra R Sawant

Professor,

Department of Elect. and Telecommunication Engg.

Sardar Patel Institute of Technology,

Munshi Nagar, Bhavans Campus, Andheri (W), Mumbai-58

022-26708520/2628 7250 (Ext: 390).

**Mob:** 99202 47002

**Email:** rajendra.sawant@spit.ac.in. rrs1902@gmail.com

**Co-Principal Investigator:**

Prof. Priya Deshpande

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Assistant Professor,
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022-26708520/2628 7250 (Ext: 355).
**Mob:** 8655172680
**Email:** priya.chimurkar@spit.ac.in

**KPEC Engineers & Contractors Pvt Ltd Project Team:**

1)Atul Karnik
2)Devendra Ranade
3)Satish Dixit

## Summary

**KPEC Engineers & Contractors Pvt Ltd** recognizes the significance of **SPIT** initiative to be the leader in the field of Education in Electronics, Communication and Computer Engineering and academia in the country. KPEC Engineers & Contractors Pvt Ltd proposes to provide an opportunity to the SPIT faculty and students to work on live projects and learn the necessary skill-set essential as per the new technological trends in the country.

This Memorandum of Understanding is intended to express the broad understanding of the partyregarding their working with each other to the extent possible for their mutual benefit.

**Executant**

| Party 1 | Party 2 |
|---|---|
| **KPEC Engineers & Contractors Pvt Ltd**<br>502, Janki Centre Premises Co. op. soc. Ltd, Andheri west, Mumbai 400053 | **Principal**<br>Sardar Patel College of Engineering.<br>Bhavan's Campus, Munshi Nagar<br>Andheri (West), Mumbai-400058 |

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| | |
|---|---|
| | Tel No. 022-26289777, Fax No. 022-26237819 |

(Authorized Signatory)

(Authorized Signatory)

Witness:

Witness:

**Enclosed documents**

**Annexure-1:Project Task Plan**

**Annexure-1:Technical Specifications of Three Phase Energy meter**

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Date DATE 21/02/2023 D D M M Y Y Y Y

1MT31

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RUPEES Twenty Five Thousand Only

₹ 25,000/-

खाता सं. A/c No. 316801010036474

चेक सं. Cheque No. 121796617

For KPEC ENGINEERS & CONTRACTORS PVT. LTD.

Director

PLEASE SIGN ABOVE THIS LINE

PAYABLE AT PAR AT ALL OUR BRANCHES IN INDIA

⑈121796617⑈ 400026126⑆ 56531220⑈ 29

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DEPARTMENT OF SCIENCE AND TECHNOLOGY
TECHNOLOGY BHAVAN, NEW MEHRAULI ROAD
NEW DELHI-110 016

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फैक्स / Fax : 26569908, 26515637, 26863847, 26862418
वेबसाइट / website : www.dst.gov.in

No. DST/TDT/TDP-16/2022

11-04-2023

Subject: Financial support for the project titled **"Design and Development of a fully automated Pressure and Vacuum controlled Precision Induction Casting Machine".**

**Dear Dr.Sawant,**

I am pleased to inform you that Department of Science & Technology has sanctioned the above mentioned project with a total cost of **Rs.70,20,723/- (Rupees Seventy Lakh Twenty Thousand Seven Hundred Twenty Three Only)** with comprising of **DST share of Rs. 60,70,723/- (Rs. 30,96,000/- in Recurring Head and Rs. 29,74,723 in Non-Recurring Head) and Industry Share of Rs. 9,50,000 (Rs. 50,000/- in Recurring Head and Rs. 9,00,000/- in Non-Recurring Head)** under the TDP programme. A copy of sanction (recurring and non recurring) has already been sent at your email ID. As per DST guidelines, the date of start of the project is the date of receipt of the fund with CNA account of ZBSA of the Host Institution. Please intimate the date of start of the project to DST immediately.

Under the manpower head, 1-Technical Assistant, 1-Project Associate-I and 2-Student Interns (as per sanction order) have been sanctioned in this project. Kindly recruit the manpower as per DST norms (**OM No. SR/S9/Z-08/2018 dated 30.01.2019 and SR/S9/Z-05/2019 dated 10.07.2020**).

Foreign travel is not permitted out of the grant sanctioned under "Travel Head" of the project. For any consumable item costing more than Rs. 20,000/- a copy of the purchase order may kindly be furnished to the undersigned. Diversion of funds from one head to another head is normally not allowed. The diversion of funds from recurring head i.e. Manpower, contingencies, consumables, travel etc. is also not allowed. However, any re-allocation of grants under different heads requires prior approval of this Department. The Statement of Expenditure and Financial year wise audited Utilization Certificate may be submitted to DST at the end of every financial year.

You may be called for a mid-term review during the execution of the project. You have to submit a Project Completion Report (PCR) along with the final audited UC and SE to the DST at the end of the project.

We wish you a grand success during the implementation of the above project.

Yours sincerely,

11/04/23

(Akhilesh Mishra)

Encl: As above

**Dr. Rajendra R. Sawant,**
Professor,
Electronics and Telecommunication,
SARDAR PATEL INSTITUTE OF TECHNOLOGY,
Andheri, Mumbai City,
Maharashtra-400058.

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GAEC 2018-19

1.5 lacs

(1)

**AGREEMENT FOR TEAMING AND JOINT WORKING**

**FOR**

**DESIGN and DEVELOPMENT OF**

**Battery Charging System of 4.5 kW capacity**

THIS AGREEMENT FOR TEAMING FOR THE DESIGN and DEVELOPMENT OF SKD/CKD KITS/SUB-ASSEMBLY OF Battery Charging Systemof 4.5kW capacity IS MADE ON THIS MONDAY, THE 31ST OF December, 2018.

Between,

(I) **GENERAL AUTO ELECTRIC CORPORATION,** a company incorporated under Indian companies Act 1956/a registered firm having its registered office at Unit No.:D207, ANSA Industrial Estate, Saki vihar Road, SAKI-NAKA, Andheri-East, Mumbai - 400072 hereinafter called as GAEC as party if the FIRST PART

And

(II). **Sardar Patel Institute Of Technology, (SPIT),**an AICTE recognized college having address Munshi Nagar, Andheri (west), Mumbai – 400058, herein after call ed as SPIT as the party of the SECOND PART.

GAEC is a company of over 50 years and is an established manufacturer and supplier of many RDSO approved products to Indian Railways, while SPIT is an established institute spread over a campus of 47 acres and is affiliated to Mumbai University. It imparts various degree courses in Engineering and also certification courses. SPIT aspires to be one of the premier R&D organization in the academic world. It also involved in Research and Development in the area of Embedded systems, VLSI design, Power Electronics, Software Technology and related areas of Computer Science. Its focus is to help create cutting edge Technologies and offer advanced training for students, Government and Industry.

GAEC and SPIT felt that their collective expertise and teaming together can help explore new business avenues for the mutual benefit of both entities. Accordingly, GAEC has approached SPIT for the teaming for the design anddevelopment of**Battery Charging System - 4.5kW** for the Railway coaches, meant for its use in Indian Railways, hereinafter called the RBC or Product.

**Alliance Objective**

The scope of the MoU, the roles and responsibilities of the parties of the MoU are given below

1. GAEC and SPIT will engage mutual cooperation in Research and Development primarily in the field of Embedded Systems, Instrumentation & automation, Power Electronics, Industrial Electronics, Communication and Computing.

2. GAEC agrees to offer internship towards the student community of S.P.I.T. that is mutually beneficial.

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GENERAL AUTO ELECTRIC CORPORATION * VASAI

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3. Research and new product development activities and joint research projects to be undertaken, funding for which will be provided by GAEC. SPIT will offer infrastructure, research human resource and laboratory facilities whenever necessary for a prescribed limited period.

**Current Project Statement**

GAEC is currently looking for the development of a Battery Charging Systems compatible with Railway's requirements and specifications. The present work is titled as "Design, implementation and testing of a DC-DC converter for ancillaries and charging battery." The proposed DC-DC converter is air cooled/naturally cooled, high conversion efficiency, safety, protection, temp, shock and vibration, as per standards (IEC/EN;UIC/AAR; and IS). This converter shall have output short circuit, over temperature, over and under voltage protection. Detail specification is annexed in **Annexure-1**.

In this context through this MOU, SPIT will develop the system within a span of 4-months. The hardware cost is provided by GAEC. SPIT project team shall build the digital control system around the Texas Instruments IC: TMS320F28069. Initially, SPIT team shall be taking help of development board, but later they will make PCboard around this IC. The TOT transfer be the handover of relevant working software/firmware on the designed system with documentation on functional explanation of each piece code block-wise for future reference and modifications, if any.

The hardware material means Inverter Bridge assembly, driver board, HF Transformer, CTs, Test Load, etc. SPIT team shall not ask for any discrete components, however, GAEC will have to provide the reasonable cost of the making of the boards/PCB along with the components. SPIT team shall purchase discrete components at their end, as and when required in the consultation with GAEC project -team and raise the necessary bill against the invoice submitted to GAEC.

PCB Art work design will be the job of SPIT team, this is in their scope of work. However, GAEC should bear PCB manufacturing cost for all of the pruto-types. SPI team will handover all the necessary PCB design files during TOT for future modifications, if any.

**Project Implementation Schedule and Commercials**

**Specifications:** **As per Annexure-1**

**Control Strategy:**

Full bridge Inverter with HF Isolation Transformer followed by a Schott-key Rectifier 200V/50A. Output is controlled with PSC. There are two control loops required. One is with output current and other is output voltage.

**Control Implementation:**

Phase shift Digital control with Texas Instrument UCD3138 64-pin programmable digital control IC OR any Texas DSP Delphino Microprocessor such as TI TMS320F28069. Switching frequency-50kHz, Transformer with ferrite core. Main Switching devices, Si Carbide MOSFET OR IGBTs.

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**Time Schedule:**

This is a four months project having total three phases

(a) The First Phase is of one month and executes following task:

**Design Phase (One Month)**

Literature Survey, Computer Simulation, Overall System Design, Process flow

Design of schematic, PCB design, Power Hardware Design, Design of Magnetics, etc.

(b) The second phase would be of two- months required for:

**Implementation (Two Months)**

Ordering and assembling components and subsystems, hardware testing, programming firmware and fine-tuning the parameters for desired specifications

(c) The third stage is a Final stage of one month utilised for:

**Testing and Handover (One Month)**

Final testing, packaging and field testing. Preparation of report / design documents, etc. as per various test parameters. Handover of TOT documents.

**Financials:**

All the hardware cost of the prototype is born by GAEC. SPIT Project team will provide required Human resource and consultancy services till project completion.

The project implementation, HR and technology transfer cost is **Rs. 1.50 Lacs** only.

**Payment Schedule:**

(a) Rs. 25,000 at the start of the projects, at the time of signing MOU

(b) Rs. 25,000 after the completion of first step of two months

(c) Rs. 50,000, after the completion of step-3 of two months

(d) Rs. 50,000 after field trial and handing over the TOT documents etc.

**SPIT Project Team:**

**Principal Investigator:**

**Dr. Rajendra R. Sawant, Professor,**
Department of Elect. and Telecommunication Engg.
**Sardar Patel Institute of Technology,**
Munshi Nagar, Bhavans Campus, Andheri (W), Mumbai-58.
022-26708520/2628 7250 (Ext: 390).
Mob: 9920247002
Email: rajendra.sawant@spit.ac.in, rrs1902@gmail.com

**Co- Investigators:**

(1) **Prof. Govind Haldankar,**
Asst Professor, Deptt. of Electronics Engg.
SPIT, Mumbai
(2) **Dr. Y S Rao,**
Vice Principal and Professor,
SPIT Mumbai

Principal
Sardar Patel Institute of Technology
Bhavans Campus,
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

**GAEC PROJECT TEAM:**

**Mr. Vijay Patel**
Technical Advisor,
**General Auto Electric Corporation,**
Plot no. 30, Sector-I, Vasai Taluka Industrial Estate,
Gavraipada, Vasai Road (East), Dist.: Palghar – 401208.
Contact: 9820189462 E-mail: vijaypatel@gaec.in

**Mr. Nehal Gandhi**
Managing Partner,
**General Auto Electric Corporation,**
Plot no. 30, Sector-I, Vasai Taluka Industrial Estate,
Gavraipada, Vasai Road (East), Dist.: Palghar – 401208.
Contact: 9820132719 E-mail: nehalgandhi@gaec.in

**Mutual Obligation**

1. This MoU may be terminated by either party through a notice of one month. Either party may terminate this MoU if either of the parties is frustrated by reasons beyond its control from going ahead with the implementation of the provision of this MoU.
2. There shall be no liability on the part of any party to the other arising from the termination of this MoU.
3. This agreement may not be amended without the prior written consent of both the parties.
4. Neither party shall issue any press release, public announcement or other such disclosure concerning this agreement without the other party's consent as to such release or announcement.
5. SPIT will sign a Non-Disclosure Agreement (NDA) necessitated to protect IPR and essential information safeguards from both sides.
6. SPIT team shall be free to employ external consultant on paid basis, if required, in specific circumstances to meet the strict time-line for project completion without violating NDA document terms.
7. Intellectual Property Rights: IPR titles or ownership of any products, proprietary information or technology tools, processes, utilities, and methodology including any GAEC proprietary products or components thereof used hereunder or development of any deliverables and all new ideas, inventions, innovations, or developments conceived, development or made by GAEC hereunder will not be transferred from GAEC to the Institute on account of use of the same as part of any work under this MoU and shall always remain with GAEC.

SARDAR PATEL INSTITUTE OF TECHNOLOGY * Andheri (W), Mumbai-58.

GENERAL AUTO ELECTRIC CORPORATION * VASAI

Principal
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Bhavan's Campus
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

2018-19

GAEC

(5)

**Summary**

**GAEC**recognizes the significance of **SPIT** initiative to be the leader in the field of Education in Electronics, Communication and Computer Engineering and academia in the country. **GAEC** proposes to provide an opportunity to the **SPIT** faculty and students to work on live projects and learn the necessary skill-set essential as per the new technological trends in the country.

This Memorandum of Understanding is intended to express the broad understanding of the parties regarding their working with each other to the extent possible for their mutual benefit.

In written whereof both parties put their hard seal on the day, month and year herein mentioned.

Date: December 31, 2018

Principal,
**Sardar Patel Institute of Technology.**

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-58.

E-mail: principal@spit.ac.in

Telephone: (022) 26708520 Ext: 305

Signed By
**Mrs. Dr. Prachi Gharpure**
For SPIT, Mumbai

Managing Partner,
**General Auto Electric Corporation,**

D/207, Ansa Industrial Estate, Sakivihar Road, Sakinaka, Andheri (West), Mumbai-72.

Signed By
**Mr. Nehal Gandhi**
For GAEC, Mumbai

Principal
Sardar Patel Institute of Technology
Bhavan's Campus,
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

## Annexure-1: Specifications

| | |
|---|---|
| **Product:** | Battery Charger |
| **Charger Type:** | Constant Voltage with Current Limit |
| **Rating:** | 135 V / 35 Amps. |
| **Input: DC at 350V** | 475 V DC to 560V DC, 5 % ripple |
| **operating Temp.:** | 0 to +55 °C |
| **Cooling:** | Natural cooling |
| **Output Voltage:** | 110 V to 135 V settable via keypad |
| **Output Current:** | Total current : 35 Amps |
| | Battery current : settable from 10 Amps - 20 Amps |
| **Load current:** | 15 Amp |
| **Output Ripple:** | 2 % rms @ 122 V |
| **Output Regulation:** | ± 2% @ 122 V for 10 % - 100 % Load |
| **Efficiency:** | ≥85 % at half load &≥ 92 % at full load for 475 V to 550 V DC |
| **Protections:** | output over voltage Trip @ 135 V |
| | output short circuit protection |
| | Constant current mode after 35 Amps. |
| | Reverse Battery Protection |
| | Thermal Trip for Transformer |
| | Thermal Trip for Power Devices |
| | Charger shall work on 35 % Load when external safety signal turns ON |
| **Front Panel Control:** | ON - OFF switch, Fault Reset push button |
| **Front Panel Indications:** | Battery Charging Indication |
| | Output Fuse Fail Indication |
| | Reverse Polarity Indication |
| | Earth Fault Indication |
| | Push Button for Fault Reset |
| **Interface module:** | Detachable - should work on serial protocol |
| **LCD &Keypad :** | LCD Display for parameter setting |
| | Fault diagnosis of |
| | input under / over voltage |
| | output short circuit |
| | reverse polarity |
| | Thermal shutdown |
| | output over voltage |
| | RTC setting &other parameter setting via key pad |
| | command for Data Down load |

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SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W), Mumbai-58

ESSEL AUTO ELECTRIC CORPORATION VASAI

| | |
|---|---|
| **USB Interface:** | for Fault Data download with Time: 500 records minimum<br>Date &Time of Fault start and end, Fault value must be recorded |
| **Other Tests:** | **Insulation resistance Test**<br>**HV Test - 1500 V AC rms for 1 minute**<br>**Surge Test - as per IEC60571**<br>**acoustic noise measurement Test**<br>Acoustic Noise Measurement: The sound pressure level shall be measured in order to ensure that it is not exceeding the limit value of 60 dB (A) at a distance of 0.5 meter away from the equipment in all the directions. Tests shall be performed at no load, 50% load and full load; however, the manufacturer shall endeavor to reduce the noise level below 60 dB (A).<br>**In the IEC 61000 for the following:-**<br>i. RFI RADIATED TEST: as per IEC 61000 – 4 – 3<br>ii. RFI CONDUCTED TEST: as per IEC 61000 – 4 – 6<br>iii. ELECTRICAL FAST TRANSIENTS TEST: as per IEC 61000 – 4 – 4<br>iv. POWER FREQUENCY MAGNETIC FIELD: as per IEC 61000 – 4 – 8 |
| **HF Transformer:** | Natural cooled, with H class Transformer .<br>Temperature of Transformers shall not exceed 100°C when corrected to 55degree |

SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W), Mumbai-58.

**Mrs. Dr. Prachi Gharpure**

For SPIT, Mumbai

GAEC VASAI

**Mr. Nehal Gandhi**

For GAEC, Mumbai

SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W) Mumbai-58 ADDITIONAL

Principal

Sardar Patel Institute of Technology

Munshi Nagar, Andheri (West),

Mumbai - 400 058.

जारी करने की तारीख से 3 माह के लिए वैध VALID FOR 3 MONTHS FROM THE DATE OF ISSUE

बैंक ऑफ इंडिया Bank of India BOI

साकी नाका शाखा, मुंबई, महाराष्ट्र - 400072
SAKI NAKA Branch, MUMBAI, MAHARASHTRA, 400 072
IFSC : BKID0000038

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D D M M Y Y Y Y

Pay Principal, SPIT Allied Division या धारक को Or Bearer

रुपये Rupees Twenty Five Thousand Only

अदा करें। ₹ 25,000/-

खा.सं. A/c No. 003830100000580

प्रेषक पावतकर्ता की आधार संख्या (वैकल्पिक) Cheque receiver's AADHAAR number (optional)

GENERAL AUTO ELECTRIC CORPORAT

इसकी एसी शाखाओं पर समाशोधन में देय PAYABLE AT ALL OUR BRANCHES IN CLEARING

Please sign above

"412526" 400013047: 001191" 13

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Principal
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

SARDAR PATEL INSTITUTE OF TECHNOLOGY

(8)

GAEC 2021-22
1.5 lakh.

**AGREEMENT FOR TEAMING AND JOINT WORKING**

**FOR**

**DESIGN and DEVELOPMENT OF**

**Battery Charging System of 4.5 kW capacity**

**(Renewed Contract)**

THIS AGREEMENT FOR TEAMING FOR THE DESIGN and DEVELOPMENT OF SKD/CKD KITS/SUB-ASSEMBLY OF Battery Charging System of 4.5kW capacity IS MADE ON THIS MONDAY, THE 24th OF JAN 2022, WHICH IS RENEWAL OF THE CONTRACT MoU SIGNED ON 24 FEB 2021.

Between,

(I) **GENERAL AUTO ELECTRIC CORPORATION,** a company incorporated under Indian companies Act 1956/a registered firm having its registered office at Unit No.: D207, ANSA Industrial Estate, Saki vihar Road, SAKI-NAKA, Andheri-East, Mumbai - 400072 hereinafter called as GAEC as party if the FIRST PART

And

(II). **Sardar Patel Institute Of Technology, (SPIT),** an AICTE recognized college having address Munshi Nagar, Andheri (west), Mumbai - 400058, herein after call ed as SPIT as the party of the SECOND PART.

GAEC is a company of over 50 years and is an established manufacturer and supplier of many RDSO approved products to Indian Railways, while SPIT is an established institute spread over a campus of 47 acres and is affiliated to Mumbai University. It imparts various degree courses in Engineering and also certification courses. SPIT aspires to be one of the premier R&D organization in the academic world. It also involved in Research and Development in the area of Embedded systems, VLSI design, Power Electronics, Software Technology and related areas of Computer Science. Its focus is to help create cutting edge Technologies and offer advanced training for students, Government and Industry.

GAEC and SPIT felt that their collective expertise and teaming together can help explore new business avenues for the mutual benefit of both entities. Accordingly, GAEC has approached SPIT for the teaming for the design and development of **Battery Charging System - 4.5kW** for the Railway coaches, meant for its use in Indian Railways, hereinafter called the RBC or Product.

**Alliance Objective**

The scope of the MoU, the roles and responsibilities of the parties of the MoU are given below

1. GAEC and SPIT will engage mutual cooperation in Research and Development primarily in the field of Embedded Systems, Instrumentation & automation, Power Electronics, Industrial Electronics, Communication and Computing.

2. GAEC agrees to offer internship towards the student community of S.P.I.T. that is mutually beneficial.

Principal
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Munshi Nagar, Andheri (West),
Mumbai - 400 058.

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3. Research and new product development activities and joint research projects to be undertaken, funding for which will be provided by GAEC, SPIT will offer infrastructure, research human resource and laboratory facilities whenever necessary for a prescribed limited period.

**Current Project Statement**

GAEC is currently looking for the development of a Battery Charging Systems compatible with Railway's requirements and specifications. The present work is titled as "Design, implementation and testing of a DC-DC converter for ancillaries and charging battery." The proposed DC-DC converter is air cooled/naturally cooled, high conversion efficiency, safety, protection, temp, shock and vibration, as per standards (IEC/EN; UIC/AAR; and IS). This converter shall have output short circuit, over temperature, over and under voltage protection. Detail specification is annexed in **Annexure-1.**

In this context through this MOU, SPIT will develop the system within a span of 4-months. The hardware cost is provided by GAEC. SPIT project team shall build the digital control system around the Texas Instruments IC: TMS320F28069. Initially, SPIT team shall be taking help of development board, but later they will make PC board around this IC. The TOT transfer be the handover of relevant working software/firmware on the designed system with documentation on functional explanation of each piece code block-wise for future reference and modifications, if any.

The hardware material means Inverter Bridge assembly, driver board, HF Transformer, CTs, Test Load, etc. SPIT team shall not ask for any discrete components, however, GAEC will have to provide the reasonable cost of the making of the boards/PCB along-with the components. SPIT team shall purchase discrete components at their end, as and when required in the consultation with GAEC project -team and raise the necessary bill against the invoice submitted to GAEC.

PCB Art work design will be the job of SPIT team, this is in their scope of work. However, GAEC should bear PCB manufacturing cost for all of the proto-types. SPI team will handover all the necessary PCB design files during TOT for future modifications, if any.

**Project Implementation Schedule and Commercials**

**Specifications:** **As per Annexure-1**

**Control Strategy:**

Full bridge Inverter with HF Isolation Transformer followed by a Schott-key Rectifier 200V/50A. Output is controlled with PSC. There are two control loops required. One is with output current and other is output voltage.

**Control Implementation:**

Phase shift Digital control with Texas Instrument UCD3138 64-pin programmable digital control IC OR any Texas DSP Delphino Microprocessor such as TI TMS320F28069. Switching frequency-50kHz, Transformer with ferrite core. Main Switching devices, Si Carbide MOSFET OR IGBTs.

**Time Schedule:**

This is a four months project having total three phases

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(a) The First Phase is of one month and executes following task:

**Design Phase , Completed**

Literature Survey, Computer Simulation, Overall System Design, Process flow

Design of schematic, PCB design, Power Hardware Design, Design of Magnetics, etc.

(b) The second phase would be of two- months required for:

**Implementation , Completed**

Ordering and assembling components and subsystems, hardware testing, programming firmware and fine-tuning the parameters for desired specifications

(c) The third stage is a Final stage of one month utilised for:

**Testing and Handover (Ongoing)**

Final testing, packaging and field testing. Preparation of report / design documents, etc. as per various test parameters. Handover of TOT documents.

**Financials:**

All the hardware cost of the prototype is born by GAEC. SPIT Project team will provide required Human resource and consultancy services till project completion.

The project implementation, HR and technology transfer cost is **Rs. 1.50 Lacs** only.

**Payment Schedule:**

(a) Rs. 25,000 at the start of the projects, at the time of signing MOU

(b) Rs. 25,000 after the completion of first step of two months

(c) Rs. 50,000, after the completion of step-3 of two months

(d) Rs. 50,000 after field trial and handing over the TOT documents etc.

**SPIT Project Team:**

**Principal Investigator:**

**Dr. Rajendra R. Sawant, Professor,**
Department of Elect. and Telecommunication Engg.
**Sardar Patel Institute of Technology,**
Munshi Nagar, Bhavans Campus, Andheri (W), Mumbai-58.
022-26708520/2628 7250 (Ext: 390).
Mob: 9920247002
Email: rajendra.sawant@spit.ac.in, rrs1902@gmail.com

SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W) Mumbai-58

**Co- Investigators:**

**Dr. Y S Rao,**
Vice Principal and Professor,
SPIT Mumbai

**GAEC PROJECT TEAM:**

**Mr. Vijay Patel**
Technical Advisor,

Principal
Sardar Patel Institute of Technology
Bhavan's Campus,
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

**General Auto Electric Corporation,**
Plot no. 30, Sector-I, Vasai Taluka Industrial Estate,
Gavraipada, Vasai Road (East), Dist.: Palghar – 401208.
Contact: 9820189462 E-mail: vijaypatel@gaec.in

**Mr. Nehal Gandhi**
Managing Partner,
**General Auto Electric Corporation,**
Plot no. 30, Sector-I, Vasai Taluka Industrial Estate,
Gavraipada, Vasai Road (East), Dist.: Palghar – 401208.
Contact: 9820132719 E-mail: nehalgandhi@gaec.in

**Mutual Obligation**

1. This MoU may be terminated by either party through a notice of one month. Either party may terminate this MoU if either of the parties is frustrated by reasons beyond its control from going ahead with the implementation of the provision of this MoU.
2. There shall be no liability on the part of any party to the other arising from the termination of this MoU.
3. This agreement may not be amended without the prior written consent of both the parties.
4. Neither party shall issue any press release, public announcement or other such disclosure concerning this agreement without the other party's consent as to such release or announcement.
5. SPIT will sign a Non-Disclosure Agreement (NDA) necessitated to protect IPR and essential information safeguards from both sides.
6. SPIT team shall be free to employ external consultant on paid basis, if required, in specific circumstances to meet the strict time-line for project completion without violating NDA document terms.
7. Intellectual Property Rights: IPR titles or ownership of any products, proprietary information or technology tools, processes, utilities, and methodology including any GAEC proprietary products or components thereof used hereunder or development of any deliverables and all new ideas, inventions, innovations, or developments conceived, development or made by GAEC hereunder will not be transferred from GAEC to the Institute on account of use of the same as part of any work under this MoU and shall always remain with GAEC.

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Mumbai-58

Principal
Sardar Patel Institute of Technology
Bhavan's Campus
Munshi Nagar, Andheri (West)
Mumbai - 400 058

## Summary

**GAEC** recognizes the significance of **SPIT** initiative to be the leader in the field of Education in Electronics, Communication and Computer Engineering and academia in the country. **GAEC** proposes to provide an opportunity to the **SPIT** faculty and students to work on live projects and learn the necessary skill-set essential as per the new technological trends in the country.

This Memorandum of Understanding is intended to express the broad understanding of the parties regarding their working with each other to the extent possible for their mutual benefit.

In written whereof both parties put their hard seal on the day, month and year herein mentioned.

Date: Jan. 17, 2022

SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W), Mumbai-58.

**Dr Y S Rao**

**Sardar Patel Institute of Technology,**

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-58.

E-mail: principal@spit.ac.in

Telephone: (022) 26708520 Ext: 305

Signed By

Vice-Principal

For SPIT, Mumbai

**Mr. Nehal Gandhi**

For GAEC, Mumbai

Managing Partner,

**General Auto Electric Corporation,**

D/207, Ansa Industrial Estate, Sakivihar Road, Sakinaka, Andheri (West), Mumbai-72,

SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W) Mumbai-58

Principal
Sardar Patel Institute of Technology
Bhavan's Campus
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

## Annexure-1: Specifications

| | |
|---|---|
| **Product:** | Battery Charger |
| **Charger Type:** | Constant Voltage with Current Limit |
| **Rating:** | 135 V / 35 Amps. |
| **Input: DC at 350V** | 475 V DC to 560V DC, 5 % ripple |
| **operating Temp.:** | 0 to +55 °C |
| **Cooling:** | Natural cooling |
| **Output Voltage:** | 110 V to 135 V settable via keypad |
| **Output Current:** | Total current : 35 Amps |
| | Battery current : settable from 10 Amps - 20 Amps |
| **Load current:** | 15 Amp |
| **Output Ripple:** | 2 % rms @ 122 V |
| **Output Regulation:** | ± 2% @ 122 V for 10 % - 100 % Load |
| **Efficiency:** | ≥85 % at half load & ≥ 92 % at full load for 475 V to 550 V DC |
| **Protections:** | output over voltage Trip @ 135 V |
| | output short circuit protection |
| | Constant current mode after 35 Amps. |
| | Reverse Battery Protection |
| | Thermal Trip for Transformer |
| | Thermal Trip for Power Devices |
| | Charger shall work on 35 % Load when external safety signal turns ON |
| **Front Panel Control:** | ON - OFF switch, Fault Reset push button |
| **Front Panel indications:** | Battery Charging Indication |
| | Output Fuse Fail Indication |
| | Reverse Polarity Indication |
| | Earth Fault Indication |
| | Push Button for Fault Reset |
| **Interface module:** | Detachable - should work on serial protocol |
| **LCD & Keypad :** | LCD Display for parameter setting |
| | Fault diagnosis of |
| | input under / over voltage |
| | output short circuit |
| | reverse polarity |
| | Thermal shutdown |
| | output over voltage |
| | RTC setting & other parameter setting via key pad |
| | command for Data Down load |

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| | |
|---|---|
| **USB interface:** | for Fault Data download with Time: 500 records minimum<br>Date &Time of Fault start and end, Fault value must be recorded |
| **Other Tests:** | **Insulation resistance Test**<br>**HV Test - 1500 V AC rms for 1 minute**<br>**Surge Test - as per IEC60571**<br>**acoustic noise measurement Test**<br>Acoustic Noise Measurement: The sound pressure level shall be measured in order to ensure that it is not exceeding the limit value of 60 dB (A) at a distance of 0.5 meter away from the equipment in all the directions. Tests shall be performed at no load, 50% load and full load; however, the manufacturer shall endeavor to reduce the noise level below 60 dB (A).<br>**in the IEC 61000 for the following:-**<br>i. RFI RADIATED TEST: as per IEC 61000 – 4 – 3<br>ii. RFI CONDUCTED TEST: as per IEC 61000 – 4 – 6<br>iii. ELECTRICAL FAST TRANSIENTS TEST: as per IEC 61000 – 4 – 4<br>iv. POWER FREQUENCY MAGNETIC FIELD: as per IEC 61000 – 4 – 8 |
| **HF Transformer:** | Natural cooled, with H class Transformer .<br>Temperature of Transformers shall not exceed 100°C when corrected to 55degree |

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Munshi Nagar, Andheri (West),
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Sileaf Technologies Pvt Ltd.
2021-22
2,00,000/-

Sileaf

**Memorandum of Understanding**
**RENEWED for the year 21-22**

This memorandum of Understanding (MOU) is signed on day of 17 th Jan 2022 between:

**Sileaf Technologies Pvt Ltd** with its principal place of business located at Adisa Icon, Mumbai Bangalore highway, Opposite HEMRL, Bavdhan, Pune 411 021 (the "Company" which term will also include its associate, holding and subsidiary group companies) hereinafter called as Sileaf as party of the FIRST PART

And

**Sardar Patel Institute of Technology**, Munshi Nagar, Andheri (West), Mumbai-58, a self-financed Engineering institute affiliated to Mumbai University and managed by Bhartiya Vidya Bhavan, a charitable trust, herein after called as SPIT as party of the SECOND PART.

**Sileaf** is in the business of design, develop and manufacture of water pumps for solar applications and other components required in the field of renewable energy sector. Sileaf is based on the philosophy of innovation. Our R&D centres consistently develop innovative products for futuristic needs and to address specific issues. The products are designed and developed to meet global standards. Sileaf products are appreciated for superior quality all over the world.

**SPIT: Background and Credentials**

SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W) Mumbai-58 AUTONOMOUS

Sardar Patel Institute of Technology (SPIT) is an AICTE recognized college spread over a campus of 47 acres and is an Autonomous College affiliated to the Mumbai University. It imparts various degree courses in Engineering and also certificate courses. SPIT aspires to be one of the premier R&D organization in the academic world.

It is also involved in Research and Development in the area of Embedded Systems, VLSI design, Power Electronics, Software Technology and related areas of computer science. Its focus is to help create cutting-edge Technologies and offer advanced training for students, Government and Industry.

Sileaf & SPIT felt that their collective expertise & teaming together can help explore new business avenues for the mutual benefit of both entities. Accordingly, Sileaf has approached SPIT for the teaming for the design & development of Universal Controllers for solar water pump sets working on renewable energy.

Suresh Sable



Principal
Sardar Patel Institute of Technology
Bhavan's Campus,
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

**Alliance Objective**

The scope of the MoU, the roles and responsibilities of the parties of the MoU are given below

1. Sileaf and SPIT will engage mutual cooperation in Research and Development primarily in the field of Embedded Systems, Instrumentation & automation, Power Electronics, Industrial Electronics, Communication and Computing.

2. Sileaf agrees to offer internship towards the student community of SPIT that is mutually beneficial.

3. Research and new product development activities and joint research projects to be undertaken, funding for which will be provided by Sileaf, SPIT will offer infrastructure, research, human resource and laboratory facilities whenever necessary for a prescribed limited period.

**Current Project Statement:** Development of Universal Controller to work for water pump sets of capacities ranging from 3 HP to 10 HP and for other types of motors used in the agriculture equipment working on renewable energy.

The development consists of Development of appropriate models of Universal controllers as required to work with motors of capacities from 3 HP to 10 HP.

Universal controllers described above to work with submersible and surface water pump sets of the range described above.

Development of above said products mean the complete development work, lab testing, field testing, eligibility to pass the requirements of required respective certifications, commercial prototype, production level designs, defining production process and standards, production and quality manuals.

Development work also includes technical support for the period of 5 years from the date of dispatch of first batch of respective products.

The hardware material means Inverter Bridge assembly, driver board, HF Transformer, CTs, Test Load, etc. SPIT team shall purchase discrete components at their end, as and when required in the consultation with Sileaf project -team and raise the necessary bill against the invoice submitted to Sileaf.

PCB Art work design will be the job of SPIT team; this is in their scope of work. SPIT team will hand over all the necessary PCB design files during TOT for future modifications, if any.

**Project Implementation Schedule and Commercials :**

Gundu Sable



SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W) Mumbai-58

Principal
Sardar Patel Institute of Technology
Andheri (West)
Mumbai - 400 058.

**Specifications:** **As per Annexure-1**

**Title:** Development of a Universal Controller to work for water pump sets of capacities ranging from 3 HP to 10 HP catering to BLDC Motor, PMSM Motor and Induction Motor and for other types of motors used in the agriculture equipment.

**Schedule:**

(a) This is a **Four months'** project having total three phases

(b) The **First Phase** is of **two months** and executes following task:

Design of schematic design, mechanical design and PCB design with the aid of literature survey, computer simulation, Ordering and assembling components and subsystems, etc.

(c) The **second phase** would be of another **one month** required for:

Hardware testing, programming firmware and integrated testing, fine-tuning the parameters for desired specifications.

(d) The **third stage** is a Final stage of **one-month** duration utilized for:

Final testing, packaging and field testing. Preparation of report / design documents, etc. as per various test parameters. Handover of TOT documents.

**Financial:** All the hardware cost is included in the project except the motor cost. The final testing facility and its related cost should be taken-up by Sileaf Technologies Pvt Ltd.

The total project development cost is Rs. 200,000 (Two Lacs only) including the cost of Institute services, Hardware prototype (Two Nos.) but excluding the Govt. taxes on the all the relevant Hardware material being purchased during proto-typing.

**Payment Schedule:**

(a) Rs. 25000/- at the start of the projects, at the time of signing MOU

(b) Rs. 50,000/- after the completion of first step of two months

(c) Rs. 50,000/- + Govt. Taxes on Material Purchased and being claimed after the completion of step-3 of two months

(d) Rs. 75000/- after field trial and handing over the TOT documents etc.

***(All the payments should be made in favor of Principal, SPIT, Allied Division after signing an MOU between both the parties).***

**SPIT PROJECT TEAM:**

**Principal Investigator:** Gurdu Sabde



Principal
Sardar Patel Institute of Technology
Bhavan's Campus,
Munshi Nagar, Andheri (West),
Mumbai - 400 058

(1) Dr. Rajendra R Sawant
Professor,
Department of Elect. and Telecommunication Engg.
Sardar Patel Institute of Technology,
Munshi Nagar, Bhavans Campus, Andheri (W), Mumbai-58
022-26708520/2628 7250 (Ext: 390).

**Mob:** 99202 47002
**Email:** rajendra.sawant@spit.ac.in, rrs1902@gmail.com

**Co- Principal Investigators:**

Co-Investigator:

Dr. Y. S. Rao,

Professor,

Deptt. of Electronics
and Telecom

SPIT, Mumbai

ysrao@spit.ac.in

**Sileaf Project Team:**

1. Sunil Joshi
2. Pravin Hidge
3. Abhay Saraf
4. Naresh Maheshwari

SARDAR PATEL INSTITUTE OF TECHNOLOGY Autonomous Mumbai-58

Principal
Sardar Patel Institute of Technology
Bhavan's Campus,
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

**Annexure-1:**
**Attached with separate Sheet**

**Mutual Obligation**

Jundu Sabde

1. This MoU may be terminated by either party through a notice of one month. Either party may terminate this MoU if either of the parties is frustrated by reasons beyond its control from going ahead with the implementation of the provision of this MoU.

2. There shall be no liability on the part of any party to the other arising from the termination of this MoU.

3. This agreement may not be amended without the prior written consent of both the parties.

4. Neither party shall issue any press release, public announcement or other such disclosure concerning this agreement without the other party's consent as to such release or announcement.

5. SPIT will sign a Non Disclosure Agreement (NDA) necessitated to protect IPR and essential information safeguards from both sides.

6. SPIT team shall be free to employ external consultant on paid basis, if required, in specific circumstances to meet the strict time-line for project completion without violating NDA document terms and with no extra liability on the first party (Sileaf).

7. Intellectual Property Rights: IPR titles or ownership of any products, proprietary information or technology tools, processes, utilities, and methodology including any Sileaf proprietary products or components thereof used hereunder or development of any deliverables and all new ideas, inventions, innovations, or developments conceived, development or made by Sileaf hereunder will not be transferred from Sileaf to the Institute on account of use of the same as part of any work under this MoU and shall always remain with Sileaf.

8. **Confidentiality and Non-Competition**

(a) <u>Obligations of Non-Disclosure and Non-Use</u>. Unless otherwise agreed to in advance and in writing by the Company, SPIT will not, except as required by law or court order, use the Confidential Information for any purpose whatsoever other than the performance of the Services or disclose the Confidential Information to any third party.

SPIT may disclose the Confidential Information only to those of its employees who need to know such information. In addition, prior to any disclosure of such Confidential Information to any such employee, such employee shall be made aware of the confidential nature of the Confidential Information and shall execute, or shall already be bound by, a non-disclosure

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Principal
Sardar Patel Institute of Technology
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

agreement containing terms and conditions consistent with the terms and conditions of this Agreement. In any event, SPIT shall be responsible for any breach of the terms and conditions of this Agreement by him and also by any of his employees. SPIT shall use the same degree of care to avoid disclosure of the Confidential Information as it employs with respect to its own Confidential Information of like importance, but not less than a reasonable degree of care.

(b) Return of Confidential Information. Upon the termination or expiration of this Agreement for any reason, or upon Company's earlier request, SPIT will deliver to Company all of Company's property or Confidential Information in tangible form that SPIT may have in his possession or control.

(c) The SPIT has confirmed that he does not have any interests conflicting with the business interests of the Company as regards Water Pumps [0.5 HP to 10 HP], Motors and controllers for solar water pumps, Improvements on Motor, Controllers including Universal Controllers.

(d) The SPIT shall not directly or indirectly associate himself with any third party to compete in any way anywhere in the world, with the entire range of business, concepts, products, services and intellectual properties of "The Company" relating to Water Pumps [0.5 HP to 10 HP], Motors and controllers including Universal Controller for solar water pumps, for a period of 5 years from the cession of the agreement with the Company.

Similarly, for a period of 5 years following the date of the cessation of this agreement with the Company, the SPIT shall not whether directly or indirectly, aid, assist, participate in, consult with, render services for, accept a position with, become employed by or otherwise enter into any relationship with any of the competitors of the Company.

(e) **Non-Circumvention**

The SPIT further and irrevocably agrees not to circumvent, avoid, by pass or obviate "The Company", directly or indirectly, anywhere in the world and avoid sharing of profits, fees in any transaction, with anybody, in connection with any transaction, in any manner whatsoever relating to Water Pumps [0.5 HP to 10 HP], Motors and controllers including Universal Controller for solar water pumps and accessories.



Gunda Sabde

Principal
Sardar Patel Institute of Technology
Bhavan's Campus,
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

## Summary

**Sileaf** recognizes the significance of **SPIT** initiative to be the leader in the field of Education in Electronics, Communication and Computer Engineering and academia in the country. **Sileaf** proposes to provide an opportunity to the SPIT faculty and students to work on live projects and learn the necessary skill-set essential as per the new technological trends in the country.

This Memorandum of Understanding is intended to express the broad understanding of the parties regarding their working with each other to the extent possible for their mutual benefit.

In written whereof both parties put their hard seal on the day, month and year herein mentioned.

Date: Jan. 17, 2022

Principal

**Sardar Patel Institute of Technology,**

Bhavan's Campus, Munshi Nagar

Andheri (West), Mumbai-58

E-mail: principal@spit.ac.in

Telephone: (022) 26708520 Ext: 305

Signature:

SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W), Mumbai-58.

CMD,

M/s Sileaf, Technologies Pvt Ltd,

Pune Maharashtra, India.

SILEAF TECHNOLOGIES PVT. LTD. PUNE-21

Signature:

Dr. Gundu Sabde

Chairman and Managing Director

Principal
Sardar Patel Institute of Technology
Bhavan's Campus,
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

Riddhi Heatron.
2021-22 (Jan-22) Academic year 1,00,000/-
~~9,50,000/-~~

Riddhi Heatron
MFG. OF : GOLD MELTING • BURNOUT • DUST BURNOUT FURNACE • ELECTRO POLISHING

# Endorsement from collaborating Industry/ Agency

I have gone through the Project Proposal entitled **"Design and Development of a fully automated Pressure and Vacuum controlled Precision Induction Casting Machine" Cost, 77.4 Lakhs, Duration: Three Years** submitted by DR. Rajendra S. Sawant for DST funding and noted the obligations and responsibilities indicated in our name as stated below:

1. Contribution in financial terms *(Rupees in Lakhs)*

   **Rs. 9,50,000/- (Rs. Nine Lacks Fifty Thousand Only)**

2. Contribution in Kind (List Activities)
   (a) Support for Mechanical Assembly, Electrical Parts like Water cooled Capacitors, TCBT Inverter Assembly, Vacuum Chamber, Heating Chamber, Front Panel Control. etc.
   (b) Fabrication of the machine body and extending fabrication facility through out tlw project duration.
   (c) Facilitate for Field Trials and Testing

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I hereby affirm that my Organization/Industry is committed to participate in the Project to the full extent as indicated in the Project Proposal including the financial liabilities accruing there from as detailed above. A summary profile of my Organization is given below:

Name of Organization : RIDDHI HEATRON
Nature of Business : MANUFACTURING OF MACHINERY
Number of Employees : 10 EMPLOYEES
Annual Turn over : 90,73,589/- (Financial Year 2020-21)

The Annual Report for the preceding financial year is enclosed.

To:
Principal,
Sardar Patel Institute of
Technology
Andheri West Mumbai 400058

**For RIDDHI HEATRON**

RIDDHI HEATRON MUMBAI

**PARAG GANDHI**
**Proprietor**

**Date: 14/01/2022**
**Place: MUMBAI**

05, Rainbow Industrial Premises, Road No. 23, M.I.D.C., Andheri (East), MUMBAI [illegible] Tel. 022-60260993, 9655551940

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Bhavan's Campus,
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

15

Bharatiya Vidya Bhavan's

Tel : 91-22- 2670 8520
2670 7440
2628 7250
Fax : 91-22- 2670 1422

(Founded in 1938 by Kulapati Dr. K. M. Munshi with the blessings of Mahatma Gandhi)

आ नो भद्रा : क्रतवो यन्तु विश्वत : /
Let noble thoughts come to us from every side

# SARDAR PATEL INSTITUTE OF TECHNOLOGY

( Autonomous Institute )

Bhavan's Campus, Munshi Nagar, Andheri (west), Mumbai - 400058, India
E mail: principal@spit.ac.in website: www.spit.ac.in

## Memorandum of Understanding

Renewal of Contract-work for the Mou Signed on 28-01-2021

This memorandum of Understanding (MOU) is signed on day of **14th Jan 2022**, between:

**Riddhi Heatron**, RIDDHI HEATRON, 05, Rainbow Industrial Premises, Next to Floral Deck Plaza, Road No. 33 M I D C Andheri (e), Mumbai - 400 093

**And**

**Sardar Patel Institute of Technology**, (SPIT), Munshi Nagar, Andheri (West), Mumbai-58, a self-financed Engineering institute affiliated to Mumbai University and managed by Bhartiya Vidya Bhavan, a charitable trust.

**Riddhi Heatron: Background and Credentials:-** Riddhi Heatron is a Mumbai based proprietary company working since last fifteen years and is a pioneer OEM company to make electric furnaces for jewelry industry. The company has ventured into nationally and internationally also and growing steadily towards customer satisfaction and innovative products. The major company products are BURNOUT ELECTRIC FURNACE, DUST BURNOUT FURNACE, ASSAYING BURNOUT FURNACE, GOLD MELTING FURNACE and ELECTROPOLISHER.

SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W) Mumbai-58

**Sardar Patel Institute of Technology: Background and Credentials**

Sardar Patel Institute of Technology (SPIT) is an AICTE recognized college spread over a campus of 4½ acres and is an Autonomous College affiliated to the Mumbai University. It imparts various degree courses in Engineering and also certificate courses. SPIT aspires to be one of the premier R&D organization in the academic world.

It is also involved in Research and Development in the area of Embedded Systems, VLSI design, Power Electronics, Software Technology and related areas of computer science. Its focus is to help create cutting-edge Technologies and offer advanced training for students, Government and Industry.

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Mumbai - 400 058.

## Alliance Objective

The scope of the MoU, the roles and responsibilities of the parties of the MoU are given below

1. Riddhi Heatron and SPIT will engage mutual cooperation in Research and Development primarily in the field of Embedded Systems, Instrumentation & automation, Power Electronics, Industrial Electronics, Communication and Computing.

2. RIDDHI HEATRON agrees to offer internship towards the student community of SPIT that is mutually beneficial.

3. Research and new product development activities and joint research projects to be undertaken, funding for which will be provided by RIDDHI HEATRON, SPIT will offer infrastructure, research human resource and laboratory facilities whenever necessary for a prescribed limited period.

## Current Project Statement

RIDDHI HEATRON is currently looking for the Design and development of a digital controller for induction casting application. (Annexure-1: Specifications)

In this context through this MOU, SPIT will develop the system within a span of 4-months. The hardware cost of the control PCB is included in the project cost. SPIT project team shall work on designing a digital controller circuit and validate the design on an experimental set-up supplied from Riddhi Heatron.

The hardware cost of the material means Inverter Bridge assembly, driver board , HF Transformer, CTs, Test Load, etc. shall be provided by RIDDHI HEATRON. SPIT team shall purchase discrete components for the control-board at their end, as and when required in the consultation with RIDDHI HEATRON. The project -team will raise the necessary bill against the invoice submitted to RIDDHI HEATRON.

PCB Art work design will be the job of SPIT team, this is in their scope of work SPI team will handover all the necessary PCB design files during TOT for future modifications, if any.

## Project Implementation Schedule and Commercials

**Specifications:** **As per Annexure-1**

Title: Design and development of a digital controller suitable for a 10kW induction casting machine with all the necessary annunciation, communication and protection as per industry standards.

The proposed board is air cooled, high conversion efficiency, safety, protection, temp, shock and vibration, as per adequate standard (CE and ISI).

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1,00,000/-

This board shall have output short circuit, over temperature, over and under voltage protection with relevant feedback mechanism and relays.

**Control : The controller is a Micro-processor based phase shifted-PWM controller with a capability of auto-tracking the resonance condition depending on change in the coil and work-piece suitable for induction casting machine.**

**Schedule:**

(a) This is a **Four months** project having total three phases (b) The **First Phase** is of **two months** and executes following task: Design of schematic design, mechanical design and PCB design with the aid of literature survey, computer simulation, Ordering and assembling components and subsystems, etc.

(c) The **second phase** would be of another **one month** required for: Hardware testing, programming firmware and integrated testing, fine-tuning the parameters for desired specifications.

(d) The **third stage** is a Final stage of **one-month** duration utilized for : final testing, packaging and field testing. Preparation of report / design documents, etc as per various test parameters. Handover of TOT documents.

**Financial:** All the PCB hardware and component cost is included in the project. The final testing facility and its related cost should be borne by RIDDHI HEATRON

The total estimated hardware prototype cost is Rs. 20,000, including development boards, PCB design and manufacturing cost for all the iterations excluding government taxes if any. The HR cost is Rs. 0.80 Lacs. The total project cost is Rs. 1,00,000, including the cost of proto-type boards and HR but excluding the Govt. taxes on all the relevant hardware material being procured during prototyping. RIODHI Heatron will deduct TDS on the HR cost as per the govt. rules on the basic cost.

**Payment Schedule:** Advance: Rs: 20k, First Phase: 20k, Second Phase:30k, Last Phase: 30k

(a) Rs. 20,000 at the start of the projects, at the time of signing MOU

(b) Rs. 20,000+Govt. Taxes after the completion of first step of two months and submission of PCB Schematic, Board design files & BOM to RIDDHI HEATRON.

(c) Rs. 30,000 +Govt. Taxes, after the completion of second stage of one month.

(d) Rs. 30,000 + Govt. Taxes, after completion of third stage of one month, which includes field trial and handing over the TOT documents etc.

***(All the payments should be made in favor of Principal, SPIT, Allied Division after signing an MOU between both the parties ).***

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Principal
Sardar Patel Institute of Technology
Bharatiya Vidya Bhavan's
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

**SPIT PROJECT TEAM:**

**Principal Investigator:**

(1) Dr.Rajendra R Sawant
Professor,
Department of Elect.and Telecommunication Engg.
**Sardar Patel Institute of Technology,**
**Munshi Nagar, Bhavans Campus, Andheri (W), Mumbai-58**
**022-26708520/2628 7250 (Ext: 390).**
**Mob: 9920247002**
Email: rajendra.sawant@spit.ac.in, rrs1902@gmail.com

**Co- Principal Investigators:** Dr. Y S Rao (EXTC) and Prof. Govind Haldankar (Elex), SPIT Mumbai

**RIDDHI HEATRON PROJECT TEAM:**

Mr. Parag Gandhi, Proprietor and Director

SARDAR PATEL INSTITUTE OF TECHNOLOGY
Andheri (W)
Mumbai-58

Principal
Sardar Patel Institute of Technology
Bhavan's Campus,
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

**Annexure-1: Specifications**

| | |
|---|---|
| **Product:** | Digital Controller for Induction Casting Machine |
| **Controller Type:** | Auto-frequency tracking and Input side power control for Temp control |
| **Rating:** | 10kW |
| **Input: AC** | 425 V AC/50Hz, Max. upto 450V |
| **operating Temp.:** | 0 to +55 °C |
| **Cooling:** | Water cooling / Air Cooling |
| **Output Voltage:** | 40V AC at 15-20KHz |
| **Output Current:** | Total current : 1000 Amps |
| **Efficiency:** | ≥85 % at half load &≥ 92 % at full load for 475 V to 550 V DC |
| **Protections:** | output over voltage Trip @ 135 V |
| | output short circuit protection |
| | Thermal Trip for Transformer and Water |
| | Thermal Trip for Power Devices |
| **Front Panel Control:** | Heat ON - OFF switch, Fault Reset push button, Error Reporting with Error codes, Temperature Adjustment, Power Adjustment |
| **Front Panel indications:** | Heat ON - OFF, Fault Reset push button, Error Reporting with Error codes, Temperature Adjustment, Power Adjustment |
| | Push Button for Fault Reset |
| | Detachable - should work on serial protocol |
| | LCD Display for parameter setting |
| | Fault diagnosis of |
| | input under / over voltage |
| | output short circuit |
| | Thermal shutdown |
| | output over voltage |
| | RTC setting &other parameter setting via key pad |

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| | |
|---|---|
| **Interface module:** | command for Data Down load |
| **LCD &Keypad** | for Fault Data download with Time: 500 records minimum<br>Date &Time of Fault start and end, Fault value must be recorded |
| **Other Tests:** | **Insulation resistance Test**<br>**HV Test - 1500 V AC rms for 1 minute**<br>**Surge Test - as per IEC60571** |
| **HF Transformer:** | Natural cooled, with H class Transformer .<br>Temperature of Transformers shall not exceed 100°C when corrected to 55degree |

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Andheri (W)
Mumbai-58

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Mumbai - 400 058.

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SARDAR PATEL INSTITUTE OF TECHNOLOGY
Andheri (W)
Mumbai-58

Principal
Sardar Patel Institute of Technology
Bhavan's Campus,
Munshi Nagar, Andheri (West)
Mumbai - 400 058.

## Summary

**Riddhi Heatron** recognizes the significance of **SPIT** initiative to be the leader in the field of Education in Electronics, Communication and Computer Engineering and academia in the country. **Riddhi Heatron** proposes to provide an opportunity to the **SPIT** faculty and students to work on live projects and learn the necessary skill-set essential as per the new technological trends in the country.

This Memorandum of Understanding is intended to express the broad understanding of the parties regarding their working with each other to the extent possible for their mutual benefit.

In written whereof both parties put their hard seal on the day, month and year herein mentioned.

Date: 14th Jan 2022

Dr B N Chaudhari

Principal,

**Principal**

**Sardar Patel Institute of Technology,**

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-58.

E-mail: principal@spit.ac.in

Telephone: (022) 26708520 Ext: 305

Managing Partner,

**Mr Parag Gandhi**

**Riddhi Heatron,**

05, Rainbow Industrial Premises,
Next to Floral Deck Plaza,
Road No. 23, M.I.D.C, Andheri (e), Mumbai - 400 093.

Tel : 40260 993 / 3088 0201

Mobile : +91 - 98203 33597
Email : parag@riddhiheatron.com

SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W) Mumbai-58

**Principal**
**Sardar Patel Institute of Technology**
Bhavan's Campus,
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

To,

The Principal,
S.P.I.T.
Andheri(W), Mumbai.

**Sub: Approval for raising the Invice in the name "Indian Times Daily "**

Dear sir,

I Dr. Pooja Raundale working as Professor in MCA department, request you to approve the invoice raised for **"Indian Times Daily "**.
MCA department has completed a consultancy project for **Indian Times Daily** details are finished below.

**Consultancy work details**

| Sr. No. | Project Details | *Development Charges | Equipments, If any | Honorariums to PI | Stipend to Interns | **Miscellaneous Expenses | Institute Share |
|---|---|---|---|---|---|---|---|
| 01 | Rs. 50000 Development of website and mobile Applications (Indian Daily Times) | | | @30% Rs. 15000 | @40% Rs. 20000 | | @30% Rs. 15000 |

**Project Budgeting**

| Sr No. | Name of the Company | Title of the project | Date of MOU and Duration | Amount | Amount received | Faculty Involved |
|---|---|---|---|---|---|---|
| 01 | Indian Daily Times Mumbai | Development of website and mobile Applications | (6 months ) | 50000 | _____ | Dr. Pooja (PI) |

Thanking you.

Sincerely yours,

Raundale

Dr. Pooja Raundale

25/7/15.

Consultancy work details

| Sr No. | Name of the Company | Title of the project | Date of MOU and Duration | Amount | Amount received | Faculty Involved |
|---|---|---|---|---|---|---|
| 01 | Indian Daily Times Mumbai | Development of website and mobile Applications | (6 months ) | 50000 | | Dr. Pooja (PI) |

## Project Budgeting

| Sr. No. | Project Details | *Development Charges | Equipments, If any | Honorariums to PI and Co-Pi | Stipend to Interns | **Miscellaneous Expenses | Institute Share |
|---|---|---|---|---|---|---|---|
| 01 | Rs. 50000 Development of website and mobile Applications (Indian Daily Times) | | | @30% Rs. 15000 | @40% Rs. 20000 | | @30% Rs. 15000 |

Bharatiya Vidya Bhavan's

Tel : 91-22-2670 8520
2670 7440
2628 7250
Fax : 91-22-2670 1422

(Founded in 1938 by Kulapati Dr. K. M. Munshi with the blessings of Mahatma Gandhi)
आ नो भद्रा : क्रतवो यन्तु विश्वत : /
Let noble thoughts come to us from every side

# SARDAR PATEL INSTITUTE OF TECHNOLOGY

( Autonomous Institute )

Bhavan's Campus, Munshi Nagar, Andheri (west), Mumbai - 400058, India

E mail: principal@spit.ac.in website: www.spit.ac.in

## TAX INVOICE

*Party Information*

**Unit 1 Productions Pvt. Ltd.**

Address :- 77/6, Shiva Ground Floor Nandidurga Road, Jayamahal Extn. Banglore 560046

Email ID:- rohit@unit1productions.com, Mobile No.:- 9980100060
CIN :- U29253KA1996PTC020182
GSTIN No.: 29AAACU2300E1ZV
Pan no. :- AAACU2300E

Invoice no: 9
Date : 01/08/2019

| SR NO. | Description | | | | Amount |
|---|---|---|---|---|---|
| 1 | *Web site & App. Development* | | | | 50,000.00 |
| | | | | Add: CGST@9% | 4,500.00 |
| | | | | Add:SGST@9% | 4,500.00 |
| | | | | | 59,000.00 |
| | | | | Less: TDS@10% | 5,000.00 |
| | | | | Net Amt | 54,000.00 |

*Amount Chargeable (in words): Rupees Fity Four Thousand only.*

*Remarks :*

1. Cheque/Neft must be drawn/done in favour of
Name SPIT Allied Division

2. Bank Details is as follows
Bank Name: Indian Bank
Branch: Bhavans Campus, Andheri (West), Mumbai
A/C No.: 876819488
IFSC Code: IDIB000B092
GST No. 27AAAT81693E6Z5

SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W) Mumbai-58

*FOR NAme*

(Authorised Signatory)

Principal
Bharatiya Vidya Bhavan's
Sardar Patel Institute of Technology
Munshi Nagar, Andheri (W).

**SPIT Allied Division (17-19)**
State Name : Maharashtra, Code : 27

**Receipt Voucher**

No. : **55** Dated : **1-Aug-2019**

| Particulars | Amount |
|---|---|
| **Account :** | |
| UNIT 1 PRODUCTIONS PVT. LTD. | **25,000.00** |
| **Through :** | |
| SB A/c with Indian Bank No 876819488 | |
| **On Account of :** | |
| Being cheq no.002129 dt.01/08/2019 of HDFC Bank towards from Unit 1 Productions Pvt. Ltd. for Web site & App Development 1st Installment | |
| **Amount (in words) :** | |
| INR Twenty Five Thousand Only | **₹ 25,000.00** |

Authorised Signatory

**SPIT Allied Division (18-20)**
State Name : Maharashtra, Code : 27

## Receipt Voucher

No. : **72** Dated : **18-Oct-2019**

| Particulars | Amount |
|---|---|
| **Account :** | |
| UNIT 1 PRODUCTIONS PVT. LTD. | **29,000.00** |
| **Through :** | |
| SB A/c with Indian Bank No 876819488 | |
| **On Account of :** | |
| Being cheq no.002168 dt.21/10/2019 of HDFC Bank from Unit 1 Prodn Pvt. Ltd. towards Bal. payment of Rs.29000/- against Inv. no.09 dt.01/08/2019 | |
| **Amount (in words) :** | |
| INR Twenty Nine Thousand Only | |
| | **₹ 29,000.00** |

18/10/19

Authorised Signatory

HDFC BANK

NO 25, 4TH CROSS, NANDI DURGA MAIN ROAD,
JAYAMAHAL EXTENTION, BANGALORE-560046,KARNATAKA
RTGS / NEFT IFSC : HDFC0002855

Weekly Holiday on SUNDAY

| 0 | 1 | 0 | 8 | 2 | 0 | 1 | 9 |
|---|---|---|---|---|---|---|---|
| D | D | M | M | Y | Y | Y | Y |

Valid for 3 months only

Pay PRINCIPAL, SPIT, ALLIED DIVISION Or Bearer

या धारक को

Rupees रुपये Twenty five Thousand Only

अदा करें ₹ 25,000/=

A/c. No. खाता 07142020000792

Brn: 2855 Pdt:202
PREMIUM CA

Payable at par through clearing/transfer at all branches of HDFC BANK LTD

VOID

For UNIT 1 PRODUCTIONS PVT LTD

Authorised Signatories

Please sign above /कृपया ऊपर हस्ताक्षर करें

⑈002629⑈ 560240088⑆ 002636⑈ 29

Smartly Built
Consulting, Design and Development
Main Office: Brooklyn, New York
Branch Office: Mumbai, India

Total Document Pages: 4
Accounting & Finance Group
Email: AFG@smartlybuilt.com
www.smartlybuilt.com

**Memorandum of Understanding**

This Memorandum of Understanding (MOU) is signed on day of **August 27, 2019**, between:

**Swapnil Choubal Product Manager**, Four Bungalows, Andheri(West) Mumbai - 400 053. www.smartlybuilt.com

**And**
**Sardar Patel Institute of Technology**, (SPIT), Munshi Nagar, Andheri (West), Mumbai-58, a self-financed Engineering institute affiliated to Mumbai University and managed by Bhartiya Vidya Bhavan, a charitable trust.

**Smartly Built: Background and Credentials:-**

Smartly Built is a dynamic technology firm based out of New York, NY offering software & business development services and also proprietary products. We have been in the business for since early 2016 and grown exponentially in this short period. Our mission is to help build smart businesses through strategy consultation, web development and competitive pricing. We value innovation, dedication and kindness. Website: www.smartlybuilt.com

**Sardar Patel Institute of Technology: Background and Credentials**

Sardar Patel Institute of Technology (SPIT) is an AICTE recognized college spread over a campus of 47 acres and is an Autonomous College affiliated to the Mumbai University. It imparts various degree courses in Engineering and also certificate courses. SPIT aspires to be one of the premier R&D organizations in the academic world.

It is also involved in Research and Development in the area of Embedded Systems, VLSI design, Power Electronics, Software Technology and related areas of computer science. Its focus is to help create cutting-edge Technologies and offer advanced training for students, Government and Industry.

## Alliance Objective

The scope of the MoU, the roles and responsibilities of the parties of the MoU are given below

1. **Smartly Built** and SPIT will engage mutual cooperation in Research and Development primarily in the field of web designing, Mobile application Designing, UI designing, Communication and Computing.

2. **Smartly Built** agrees to offer internship towards the student community of SPIT that is mutually beneficial.

3. Research and new product development activities and joint research projects to be undertaken, funding for which will be provided by Smartly Built, SPIT will offer infrastructure, research human resource and laboratory facilities whenever necessary for a prescribed limited period.

**Current Project/ Service Statement:**

Students will be working on multiple projects for building wireframes, Video editing and designs required for the web application as well as android and IoS apps.
The basic requirement lists are as follows:

Tools required majorly would be Figma, Adobe, Photoshop and Adobe Illustrator. Duration of the collaboration would be from 3 months to 6 months. We are expecting that the tenure should be mutually agreed upon before initiation of the project.

Project start on August 27, 2019 (Thursday) and Ends on February 29, 2020 (Tuesday) (Tentative date)

**Responsibilities:**

To develop the i) Wireframes for the projects
ii) User interface designs for the apps.
iii) Creative social media posts for product promotions

iv) Any other designing work that comes up for projects thats comes up.
v) Video editing and white paper designing.

**Mutual Obligation**

1. This MoU may be terminated by either party through a notice of one month. Either party may terminate this MoU if either of the parties is frustrated by reasons beyond its control from going ahead with the implementation of the provisions of this MoU.

NOTE: If the MOU is terminated for any reason, then smartly built is entitled to receive all the details of the work done till then including source code, action list and other relevant information.

2. There shall be no liability on the part of any party to the other arising from the termination of this MoU.

3. This agreement may not be amended without the prior written consent of both the parties.

4. Neither party shall issue any press release, public announcement or other such disclosure concerning this agreement without the other party's consent as to such release or announcement.

5. SPIT will sign a Non-Disclosure Agreement (NDA) necessitated to protect IPR and essential Information safeguards from both sides.

6. SPIT team shall be free to employ external consultant on paid basis, if required, in specific circumstances to meet the strict timeline for project completion without violating NDA document terms and with no extra liability on the first party (ITD).

7. Intellectual Property Rights: IPR titles or ownership of any products, proprietary information or technology tools, processes, utilities, and methodology including any ITD proprietary products or components thereof used hereunder or development of any deliverables and all new ideas, inventions, innovations, or developments conceived, development or made by ITD hereunder will not be transferred from ITD to the Institute on account of the use of the same as part of any work under this MoU and shall always remain with ITD.

8. Appointed students on these projects will be provided by training by the first party. Appointed students will work for 10 to 12 hrs per week. (or weekends as per requirement of project/service work). Appointed student will get ten days off prior to exams (Mid Semester Exam and End Semester Exam).

## Project/ Service Implementation Schedule and Commercials

**Schedule: (specify tentative schedule)**

(a) This is a **six months** project.

**Financial:**

The total service cost that will be paid by Smartly Built is INR 6000/month per student.

Payment Schedule - At the end of every amount will be paid for the period of 6 months.

***(All the payments should be made in favor of Principal, SPIT, Allied Division after signing an MOU between both the parties).***

## SPIT PROJECT TEAM:

**Principal Investigator:**

(1) Dr. Aarti M. Karande
Assistant Professor,
Master of Computer Application Department.
Sardar Patel Institute of Technology,
Munshi Nagar, Bhavans Campus, Andheri (W), Mumbai-58
022-26708520/2628 7250 (Ext: 390).
Mob: 9920625758
Email: aartimkarande@spit.ac.in

25/9/19

**Smartly Built Project Team:**

(1) Swapnil Choubal
Project Manager, Smartly Built,
9158758368
swapnil.c@samrtlybuilt.com

Principal
Bharatiya Vidya Bhavan's
Sardar Patel Institute of Technology
Munshi Nagar, Andheri (W),
Mumbai - 400 058.

2018-19, 1,85,000=00

Hardcarb. Surfacing. Automation. Innovation.

## Memorandum of Understanding

This memorandum of Understanding (MOU) is signed on day of 5th December 2018, between:

**Hardcarb Technologies Pvt Ltd** (HTPL), R 728, TTC Industrial Area, MIDC Rabale, Navi Mumbai 400701, Maharashtra, India, a company working in Surfacing, Automation, Innovation, etc.

And

**Sardar Patel Institute of Technology**, (SPIT), Munshi Nagar, Andheri (West), Mumbai-58, a self-financed Engineering institute affiliated to Mumbai University and managed by Bhartiya Vidya Bhavan, a charitable trust.

**Hardcarb Technologies Pvt Ltd: Background and Credentials:-** Since close to 2 decades, Hardcarb Technologies (formerly Vautid-Shah Hardface Pvt. Ltd.) has been acting as a one-stop-shop for all procedures of wear protection. The 360 degree product spectrum encompasses all solutions to combat abrasion, erosion and impact associated with temperature and/or corrosion problems. The product mix ranges from deposition welding materials to composite wear plates to wear-resistant cast products. High end cladding techniques, robotic SPM's, automatic re-conditioning of worn components are also part of Hardcarb's core competencies. Focus markets: Cement plants, Steel plants, Coal-based power plants, Mines etc. Specialties: Wear-protection solutions, Welding & Cutting automation, Reverse Engineering, composite wear plates, wear consulting, hardfacing stick electrodes, hardfacing flux-cored wires.

**Sardar Patel Institute of Technology: Background and Credentials**

Sardar Patel Institute of Technology (SPIT) is an AICTE recognized college spread over a campus of 47 acres and is an Autonomous College affiliated to the Mumbai University. It imparts various degree courses in Engineering and also certificate courses. SPIT aspires to be one of the premier R&D organization in the academic world.

It is also involved in Research and Development in the area of Embedded Systems, VLSI design, Power Electronics, Software Technology and related areas of computer science. Its focus is to help create cutting edge Technologies and offer advanced training for students, Government and Industry.

SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W) Mumbai-58

Principal
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Sard... ...chnology
... (West),

**Alliance Objective**

The scope of the MoU, the roles and responsibilities of the parties of the MoU are given below

1. HTPL and SPIT will engage mutual cooperation in Research and Development primarily in the field of Embedded Systems, Instrumentation & automation, Power Electronics, Industrial Electronics, Communication and Computing.
2. HTPL agrees to offer internship towards the student community of SPIT that is mutually beneficial.
3. Research and new product development activities and joint research projects to be undertaken, funding for which will be provided by HTPL, SPIT will offer infrastructure, research human resource and laboratory facilities whenever necessary for a prescribed limited period.

**Current Project Statement**

HTPLis currently looking for the Design and development of a 24V/15A DC Motor PWM drive for PMDC OR Shunt DC Motor with four-quadrant operation features with a option of dynamic braking with all the necessary annunciation, communication and protection as per industry standards. (Annexure-1)

In this context through this MOU, SPIT will develop the system within a span of 4-months. The hardware cost is included in the project cost. SPIT project team shall work on both speed and torque control loops with appropriate signal conditioning and feedback, the system would be implemented with a DSP Microprocessor platform. The stator is fed from a PWM Converter. Front-end Rectifier+ DC-DC Converter is additionally implemented to enable the operation from 230V, Single Phase AC Mains.

The TOT transfer be the handover of relevant working software/firmware on the designed system with documentation on functional explanation of each piece code block-wise for future reference and modifications, if any.

The hardware material means Inverter Bridge assembly, driver board , HF Transformer, CTs, Test Load, etc. SPIT team shall purchase discrete components at their end, as and when required in the consultation with HTPL project -team and raise the necessary bill against the invoice submitted to HTPL.

PCB Art work design will be the job of SPIT team, this is in their scope of work SPI team will handover all the necessary PCB design files during TOT for future modifications, if any.

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The total project cost is Rs. 1,85,000, including the cost of proto-type and HR but excluding the Govt. taxes on all the relevant hardware material being procured during prototyping.

**Payment Schedule:** Advance: Rs: 25k, First Phase:60k, Second Phase:50k, Last Phase: 50k

(a) Rs. 25,000 at the start of the projects, at the time of signing MOU
(b) Rs. 60,000 after the completion of first step of two months and submission of PCB Schematic, Board design files & BOM to HTPL.
(c) Rs. 50,000, after the completion of second stage of one month.
(d) Rs. 50,000 + Govt. Taxes after completion of third stage of one month, which includes field trial and handing over the TOT documents etc.

***(All the payments should be made in favor of Principal, SPIT, Allied Division after signing an MOU between both the parties ).***

**SPIT PROJECT TEAM:**

**Principal Investigator:**

(1) Dr.Rajendra R Sawant
Professor,
Department of Elect.and Telecommunication Engg.
**Sardar Patel Institute of Technology,**
**Munshi Nagar, Bhavans Campus, Andheri (W), Mumbai-58**
**022-26708520/2628 7250 (Ext: 390).**

**Mob: 9920247002**
**Email:** rajendra.sawant@spit.ac.in rrs1902@gmail.com

SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W) Mumbai-58.

**Co- Principal Investigators:**

Co-Investigator (1)
Dr. Y S Rao,
Professor,
Dept. of Electronics & Telecom
SPIT, Mumbai
ysrao@spit.ac.in

Co-Investigator (2)
Dr. RajendraSutar,
Associate Professor,
Dept. of Electronics
SPIT, Mumbai
rajendra_sutar@spit.ac.in

**HTPL PROJECT TEAM**

Mr. Rishi Shah,
Director - Automation
rishi@hardcarb.com

Principal
Sardar Patel Institute of Technology
Bhavan's Campus,
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

**Project Implementation Schedule and Commercials**

**Specifications:** **As per Annexure-1**

**Title:** Design and development of a 24V/15A DC Motor PWM drive for PMDC OR Shunt DC Motor with four-quadrant operation features with a option of dynamic braking with all the necessary annunciation, communication and protection as per industry standards.

The proposed DC Drive is air cooled, high conversion efficiency, safety, protection, temp, shock and vibration, as per adequate standard (CE and ISI).

This converter shall have output short circuit, over temperature, over and under voltage protection with relevant speed and torque feedback.

**Control :**Both speed and torque control loops with appropriate signal conditioning and feedback implemented with a DSP Microprocessor platform. The stator is fed from a PWM Converter. Front-end Rectifier+ DC-DC Converter is additionally implemented to enable the operation from 230V, Single Phase AC Mains.

**Schedule:**

(a) This is a **Four months** project having total three phases

(b) The **First Phase** is of **two months** and executes following task:

Design of schematic design, mechanical design and PCB design with the aid of literature survey, computer simulation, Ordering and assembling components and subsystems, etc.

(c) The **second phase** would be of another **one month** required for:

Hardware testing, programming firmware and integrated testing, fine-tuning the parameters for desired specifications.

(d) The **third stage** is a Final stage of **one-month** duration utilisedfor :

Final testing, packaging and field testing.Preparation of report / design documents, etc as per various test parameters.Handover of TOT documents.

**Financial:** All the hardware cost is included in the project except the motor cost. The final testing facility and its related cost should be borne by Hardcarb Technologies Pvt Ltd.

The total estimated hardware prototype cost is Rs. 60,000, including development boards, PCB design and manufacturing cost for all the iterations excluding government taxes if any.

The project implementation, HR and technology transfer cost is Rs. 1.25 Lacs.

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## Annexure-1: Specifications

### Specifications

| Characteristic | Symbol | Required Value | Unit |
|---|---|---|---|
| Max. Output Power | $P_{out}$ | 400 | W |
| Input AC Voltage nominal, Single Phase, 50HZ | $V_{nom}$ | 230 | V, RMS |
| Maximum Input voltage | $V_{max}$ | 270 | V, RMS |
| Minimum Input voltage | $V_{min}$ | 85 | V, RMS |
| Maximum input current | $I_{max}$ | 5 | A |
| MotorVolt/Current | | 24V / 15A DC | |
| Motor Torque | | 11 | N.m |
| Motor-type | | PMDC (Geared/withoutGear) | |
| Speed Sensing | | Tachogenerator,HallEffect,Back EMF | |
| Speed Reference | Settable | Pot, +/- 10V from PLC, Ethernet, SPI | |
| Braking | | Dynamic (Regeneration, if possible) | |
| Operating ambient | $T_{amb}$ | 0-55 degrees | C |
| Efficiency | $\eta$ | 95% | |
| Communication | | CAN, Ethernet, SPI | |
| Height | | TBD | mm |
| Width | | TBD | mm |
| Length | | TBD | mm |
| Cooling Arrangement | | Air Cooling with Heatsink at the bottom, preferably natural cooling | |
| Shock & Vibration | | TBD | |
| EMC standard | CISPER 25 | The system shall be designed to CISPER 25 | |
| Safety standard | IEC 60664-1 | Insulation coordination | |
| PCB | IPC2221 | Printed circuit board, 4 Layer | |

**Note: The input power stage shall employ use of some form of high frequency chopping mechanism to convert 85-270VAC to low power which will further be used for the rectification to DC. Standard bulky isolation transformers shall not be employed.**

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Sardar Patel Institute of Technology
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

**Mutual Obligation**

1. This MoU may be terminated by either party through a notice of one month. Either party may terminate this MoU if either of the parties is frustrated by reasons beyond its control from going ahead with the implementation of the provision of this MoU.

   **NOTE: If the MOU is terminated for any reasons, then HTPL is entitled to receive all the details of the work done till then including the PCB Schematics, Board files, BOM, and other relevant information. If HTPL has given any material to aid testing or development to SPIT then it shall be returned back to HTPL.**

2. There shall be no liability on the part of any party to the other arising from the termination of this MoU.

3. This agreement may not be amended without the prior written consent of both the parties.

4. Neither party shall issue any press release, public announcement or other such disclosures concerning this agreement without the other party's consent as to such release or announcement.

5. SPIT will sign a Non-Disclosure Agreement (NDA) necessitated to protect IPR and essential information safeguards from both sides.

6. SPIT team shall be free to employ external consultant on paid basis, if required, in specific circumstances to meet the strict time-line for project completion without violating NDA document terms and with no extra liability on the first party (HTPL).

7. Intellectual Property Rights: IPR titles or ownership of any products, proprietary information or technology tools, processes, utilities, and methodology including any HTPL proprietary products or components thereof used hereunder or development of any deliverables and all new ideas, inventions, innovations, or developments conceived, development or made by HTPL hereunder will not be transferred from HTPL to the Institute on account of use of the same as part of any work under this MoU and shall always remain with HTPL

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**Summary**

**Hardcarb Technologies Pvt Ltd** recognizes the significance of **SPIT** initiative to be the leader in the field of Education in Electronics, Communication and Computer Engineering and academia in the country. HTPL proposes to provide an opportunity to the SPIT faculty and students to work on live projects and learn the necessary skill-set essential as per the new technological trends in the country.

This Memorandum of Understanding is intended to express the broad understanding of the parties regarding their working with each other to the extent possible for their mutual benefit.

In written whereof both parties put their hard seal on the day, month and year hereinabove mentioned.

Date: December 5, 2018

Principal

**Sardar Patel Institute of Technology.**

Bhavan's Campus, Munshi Nagar

Andheri (West), Mumbai-58

E-mail: principal@spit.ac.in

Telephone: (022) 26708520 Ext: 305

Signature:

Mrs. Dr. Prachi Gharpure

For SPIT, Mumbai

Director - Automation,

**Hardcarb Technologies Pvt. Ltd.**
(Formerly Vautid-Shah Hardface Pvt.Ltd.)

R 728, TTC Industrial Area, MIDC Rabale, Navi Mumbai 400701, Maharashtra, India.

Email: rishi@hardcarb.com

Signature:

SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W) Mumbai-58

Mr. Rishi Shah

For Hardcarb Technologies Pvt. Ltd.

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Sardar Patel Institute of Technology
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PUR/05/Rev No. 00

Ref. No: VS/18-19/G13562
Date: 05/12/2018

Bartiya Vidya Bhavan's Sardar Patel Institute Of Y
Munshi Nagar
Andheri ( W ) ,
Mumbai

## WORK ORDER

As per the MoU signed between **Hardcarb Technologies Pvt Ltd** and **Sardar Patel Institute of Technology** dated December 05, 2018, we hereby agree to the following project schedule and payment terms

Title of the Project: **Design and development of a 24V/15A DC Motor PWM drive for PMDC OR Shunt DC Motor**

### PROJECT COST

The total project cost is Rs. 1,85,000, including the cost of proto-type, hardware, software & technology transfer as defined in MOU.

### Government Taxes

(a) GST will be at actual extra on total project cost
(b) TDS will be deducted on total project cost as per Income Tax rule

### Payment Schedule:

i) Rs. 25,000 at the start of the project, at the time of signing MOU

ii) Rs. 60,000 after the completion of first phase of two months

iii) Rs. 50,000, after the completion of second phase of one month

iv) Rs. 50,000 after field trial and handing over the TOT documents etc

v) An invoice will need to be raised along with GST for claiming payment against each stage

vi) From all above schedule payments TDS will be deducted @ 10%

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Mumbai-400 058.

Therefore, as a first installment as per the terms of Mou, we are sending herewith a Cheque of Rs. 25000/-, in favor of "**Principal, SPIT Allied Services**", to start the execution of the Project.

Amount: Rs. 25000/-
Cheqe No. 009387
Date: 05.12.2018
Bank Name and Branch: HDFC Bank Ltd., Sion Circle,Mumbai

Please accept the amount and acknowledge the receipt of payment

Hardcarb
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Ref. No: VS/18-19/G13582
Date: 05/12/2018

**Our GST ID No** : **27AAACV9024A1ZN**

**IMPORTANT TERMS RELATED TO GST:**

- Correct HSN/SAC code shall be mentioned in Tax Invoice.
- Tax invoice shall be submitted in a timely manner to us.
- Utmost care shall be taken while uploading the data on GST portal to avoid mismatching of data and loss of credit.
- In case of mismatch of data uploaded on GST Portal, corrective action shall be taken immediately under intimation to us.
- In case of denial of GST Credit by GST Department because of your non-compliance and/or failed to take corrective action, equivalent amount of tax credit along with interest or penalty, if any, imposed by GST Department will be recovered from your due payment.

We trust you will find the above in order. Please send us your acceptance of order.

Prepared By

Checked By

**For Hardcarb Technologies Pvt Ltd**

Amit R. Shah
Director- Operations

SARDAR PATEL INSTITUTE OF TECHNOLOGY
Andheri (W)
Mumbai-58

**Principal**
**Sardar Patel Institute of Technology**
Bhavan's Campus,
**Munshi Nagar, Andheri (West),**
**Mumbai - 400 058.**

2018-19
Suyog telematics Pvt Ltd Rs, 1,00,000/-

2018-19

Bhavan's

[Founded in 1938 by Kulapati Dr. K. M. Munshi with the blessings of Mahatma Gandhi]
आ नो भद्रा : क्रतवो यन्तु विश्वत : /
Let noble thoughts come to us from every side

# SARDAR PATEL INSTITUTE OF TECHNOLOGY

( Autonomous Institute )
Bhavan's Campus, Munshi Nagar, Andheri (west), Mumbai - 400058, India
E mail: principal@spit.ac.in website: www.spit.ac.in

## Memorandum of Understanding

This memorandum of Understanding (MOU) is signed on day of 30th August 2018, between Suyog telematics Limited, 41, Suyog Industrial Estate, 1st Floor L.B.S. Marg, Vikhroli (W), Mumbai-83 and Sardar Patel Institute of Technology, Munshi Nagar, Andheri (West), Mumbai-58, a self-financed Engineering institute affiliated to Mumbai University.

SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W) Mumbai-58

**Suyog telematics Limited. Background and Credentials**

Suyog telematics Limited is a growing passive telecommunication infrastructure provider in India, engaged primarily in the business of installing and commissioning of Poles, Towers and Optical Fibre Cable ("OFC") Systems in India. "Passive infrastructure" refers to the telecommunication towers for wireless telecommunication services and "OFC" is used for the purpose of hosting and assisting in the operation of the active infrastructure used for transmitting telecommunications signals or transporting voice and data traffic.

Registered as Infrastructure Provider Category-I (IP-I) with DoT (Department of Telecommunications). With our high quality, cost-effective and time bound services, we have also gained a good presence in the Telecom Industry as a TSP Vendor. Provided a number of Poles and Infrastructure on lease over various areas in and around Maharashtra and Uttarakhand and have also installed BTS equipments on poles for most of the leading Mobile Service Providers in India, including, Bharti Airtel Ltd., Vodafone Essar Ltd., Idea Cellular Ltd., and TTML. Having been in the business of civil construction for over 2 decades, our group has completed installation of more than 200 Poles for various TSPs and about 10,000 Roof-Top Towers for BSNL on job work basis. As on June 30, 2013, fully completed owned portfolio of passive infrastructure consists of 301 Poles in and around Mumbai and 81 towers in and around Maharashtra and Uttarakhand. In addition, have own optical fiber cable network of about 150 km in and around Mumbai.

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Mumbai - 400 058.

## Background of Sardar Patel Institute of Technology

Sardar Patel Institute of Technology (S.P.I.T.) is an AICTE recognized college spread over a campus of 47 acres and is affiliated to the Mumbai University. It imparts various degree courses in Engineering and also certificate courses. S. P. I. T. aspires to be one of the premier R&D organization in the academic world.

It is also involved in Research and Development in the area of Embedded Systems, VLSI design, Power Electronics, Software Technology and related areas of computer science. Its focus is to help create cutting-edge Technologies and offer advanced training for students, Government and Industry.

### Alliance Objective

- The scope of the MoU, the roles and responsibilities of the parties of the MoU are given below

1. Suyog telematics Limited and S.P.I.T. will engage mutual cooperation in Research and Development primarily in the field of Embedded Systems, Instrumentation & automation, Power Electronics, Communication and Computing.
2. Suyog telematics Limited agrees to offer internship towards the student community of S.P.I.T. that is mutually beneficial.
3. Research activities and joint research projects to be undertaken, funding for which will be provided by Suyog telematics Limited S.P.I.T. will offer infrastructure and laboratory facilities when necessary for a limited period.

- **Project Statement**

Suyog Telematics Ltd. is a prominent infrastructure service provider company for Telecom Service provider in India. Suyog Telematics Ltd. is currently looking for development of Mobile Application to monitor maintenance activities through mobile application to their 1800 cell sites.

In this context through this MOU, SPIT will develop Mobile application for servicing maintenance calls, opening and closing of maintenance service tickets and keeping track with all the data-bases stored in cloud server to track history and record. This application also needs to develop a maintenance-website and two mobile applications linked to that one for service people and another for an administrator.

SARDAR PATEL INSTITUTE OF TECHNOLOGY Attached to Mumbai-58

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## Project Implementation Schedule and Commercials

This will be developed by students and well trained faculty who posses requisite skill-set and interest towards implementation and successful completion of the project.

(1) The project would be a development project and total span could be of two years.
(2) First Year; six months shall be utilised for development of mobile applications and maintenance website.
(3) First year, another six months to test the pilots running on site.
(4) The first half of second year will be required for transforming pilot into full. product and review of software maintenance and fixing software logistics.
(5) The last part would be handover of all source code and TOT documents with a software test report/certificate.

The project should be termed as SPIT institutional consultancy project and all the relevant official documents would be rooted through SPIT Principal and concerned officials.

The project cost estimation would be as follows:

The entire project cost is **Rs. 100,000 (One lac)**
The steps for disbursal of funds would be as follows:
*(All the duration mentioned below shall be considered from the start date after signing MOU document)*

(a) 25% at the start of this project as advance
(b) Next 25% after six months at the time of deployment of pilot
(c) Next 25% after one year, at the time of deployment of full product
(d) Final 25% at the time of TOT and testing reports handover.
(e) All the payments from Suyog Telematics to SPIT shall be in favor of " Principal, SPIT Allied division"

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Mumbai-58.

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Mumbai - 400 058.

## Mutual Obligation

1. This MoU may be terminated by either party through a notice of one month. Either party may terminate this MoU if either of the parties is frustrated by reasons beyond its control from going ahead with the implementation of the provision of this MoU.

2. There shall be no liability on the part of any party to the other arising from the termination of this MoU.

3. This agreement may not be amended without the prior written consent of both the parties.

4. Neither party shall issue any press release, public announcement or other such disclosure concerning this agreement without the other party's consent as to such release or announcement.

5. Intellectual Property Rights: IPR titles or ownership of any products, proprietary information or technology tools, processes, utilities, and methodology including any Suyog telematics Limited proprietary products or components thereof used hereunder or development of any deliverables and all new ideas, inventions, innovations, or developments conceived, development or made by Suyog telematics Limited hereunder will not be transferred from Suyog telematics Limited to the Institute on account of use of the same as part of any work under this MoU and shall always remain with Suyog telematics Limited

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Mumbai-58.

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Munshi Nagar, Andheri (West),
Mumbai - 400 058.

## Summary

Suyog telematics Limited recognizes the significance of S.P.I.T. initiative to be the leader in the field of Electronics, Communication and Computer related academia in the country. Suyog telematics Limited proposes to make availability of the appropriate technology and expertise to develop S.P.I.T. position as a leading institute in the country providing highly quality resources.

This Memorandum of Understanding is intended to express the broad understanding of the parties regarding their working with each other to the extent possible for their mutual benefit.

In written whereof both parties put their hard seal on the day, month and year herein mentioned.

Date: 30th August 2018

Principal

Sardar Patel Institute of Technology,

41, Suyog Industrial Estate,

Bhavan's Campus, Andheri (West)

Mumbai-58.

E-mail: principal@spit.ac.in

Telephone: (022) 26708520 Ext: 305

Signature:

(Dr. Prachi Gharpure)

Date: 30th August 2018

Director,

Suyog telematics Limited

1st Floor L.B.S. Marg, Vikhroli (W),

Mumbai-83

E-mail: sgl@suyogtelematics.com

Telephone: +91-22-25795516

Signature:

(Mrs. Leena Govekar)

SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W), Mumbai-58.

Principal
Sardar Patel Institute of Technology
Bhavan's Campus,
Munshi Nagar, Andheri (West),
Mumbai - 400 058.

Zeuva Automative Pvt Ltd. 2018-19

Bharatiya Vidya Bhavan's

Rs 1,00,500/-

2018-19

Fax 91-22-28

[Founded in 1938 by Kulpati Dr. K. M. Munshi with the blessings of Mahatma Gandhi]

आ नो भद्रा : क्रतवो यन्तु विश्वत : /

Let noble thoughts come to us from every side

SARDAR PATEL INSTITUTE OF TECHNOLOGY

( Autonomous Institute )

Bhavan's Campus, Munshi Nagar, Andheri (west), Mumbai - 400058, India

E mail: principal@spit.ac.in website: www.spit.ac.in

## Memorandum of Understanding

This memorandum of Understanding (MOU) is signed on day of 29th November 2018, between:

**Zeuva Automotive Private Limited** (Zeuva), B Wing, 5th Floor, Ackruti Trade Center MIDC, Andheri East, Mumbai- 93, a private limited company working on adoption of Electric Vehicle Technology and solving customer adoption problems related with this.

And

**Sardar Patel Institute of Technology**, (SPIT), Munshi Nagar, Andheri (West), Mumbai-58, a self-financed Engineering institute affiliated to Mumbai University and managed by Bhartiya Vidya Bhavan, a charitable trust.

SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W) Mumbai-58

**Zeuva Automotive Private Limited. Background and Credentials**

Zeuva Automotive is a startup with a mission to enable adoption of electric vehicle technology. Currently they are developing a battery management system including proprietary and patent pending thermal management system for light electric vehicles.

Zeuva Automotive is founded by Mr. Nishant Runjan. Nishant has substantial experience working with early stage companies. His last role was as CTO of MyGlamm (Sanghvi Brands Pvt Ltd), a company listed on Bombay Stock Exchange. He has started and run a couple of ventures in algorithmic trading software and services. He has worked as Senior Consultant, CapGemini for clients across all developing countries. He also holds a Bachelors of Technology from Indian Institute of Technology, Kharagpur.

He is advised by Mr Arjun Malhotra, a pioneer in Information Technology industry who co-founded HCL Technologies and Headstrong. He is an eminent person on boards of many companies, institutes, etc.

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Mumbai - 400 058.

## Background of Sardar Patel Institute of Technology

Sardar Patel Institute of Technology (SPIT) is an AICTE recognized college spread over a campus of 47 acres and is affiliated to the Mumbai University. It imparts various degree courses in Engineering and also certificate courses. SPIT aspires to be one of the premier R&D organization in the academic world.

It is also involved in Research and Development in the area of Embedded Systems, VLSI design, Power Electronics, Software Technology and related areas of computer science. Its focus is to help create cutting-edge Technologies and offer advanced training for students, Government and Industry.

## Alliance Objective

The scope of the MoU and the roles and responsibilities of the parties of the MoU are given below

1. Zeuva and SPIT will engage mutual cooperation in Research and Development primarily in the field of Embedded Systems, Instrumentation & automation, Power Electronics, Industrial Electronics, Communication and Computing in the areas of electric vehicle technology which may include battery management system, charger, etc.
2. Zeuva intends to hire full time employees and interns from the student community of S.P.I.T. that is mutually beneficial.
3. SPIT through its Training and Placement Office or through other means (, which might be outside the SPIT student community,) will enable Zeuva to identify relevant employees and interns. Also to provide technical vetting for identified resources.
4. Relevant experts from SPIT will provide technical guidance to the employees or interns hired mentioned above on a regular basis in a timely manner.
5. Zeuva agrees to share relevant hardware / firmware design which SPIT will use solely for the purpose of guiding above mentioned interns / employees.
6. Research and new product development activities and joint research projects to be undertaken, funding for which will be provided by Zeuva, SPIT will offer infrastructure, research human resource and laboratory facilities whenever necessary for a prescribed limited period.

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## Current Engagement

Zeuva is currently developing of a Battery Management Systems for a Lithium Ion battery pack compatible with a standard electric two / three wheeler currently plying in India. Zeuva uses Atmel's platform for its embedded system development.

Subject matter experts from SPIT will identify 2-3 interns initially from the student community at SPIT who will have firmware and / or hardware development skills for completing the development work of battery management system. If required, SPIT might organize a session on EV business and technology for the purpose. Zeuva can also independently source such candidates. SPIT experts will vet the skills of such candidates.

Zeuva and SPIT will together set down the schedule for development of features of the project. SPIT subject matter experts will provide guidance to selected candidates on a daily basis. Toward this we will allocate a certain number of hours per month towards this activity. Zeuva will appropriately compensate for this time.

SPIT and Zeuva will work together to identify full time employees for Zeuva amongst its current and past student community. The subject matter experts will vet or advise such an individual on as needed basis.

All development work will happen out of Zeuva office space within SPIT building. SPIT experts might be needed once in a while to visit Zeuva office for providing relevant guidance.

## Project Commercials

SPIT subject matter experts will allocate 300 hours for consultation and advisory services. This will be compensated on a per hour basis rate of Rs 335 per hour for a total consultation cost of **Rs 1,00,500.**

## Schedule:

This is a six months project. The detail timeline for the project will be developed in co-ordination with experts.

## Financials:

All the hardware cost of the prototype is born by Zeuva. SPIT Project team will provide required Human resource and consultancy services till project completion.

## Payment Schedule:

Advance of **Rs 15,000** will be made at the start of the period and then based on hours completed every quarter.

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## SPIT PROJECT TEAM:

### Principal Investigator:

(1) Dr. Rajendra R Sawant

Professor,
Department of Elect. and Telecommunication Engg.
Sardar Patel Institute of Technology,
Munshi Nagar, Bhavans Campus, Andheri (W), Mumbai-58
022-26708520/2628 7250 (Ext: 390).

Mob: 9920247002
**Email:** rajendra.sawant@spit.ac.in, rrs1902@gmail.com

### Co- Investigators:

Dr. Y S Rao,

Vice Principal and Professor, Dept. of Electronics and Telecommunications

SPIT Mumbai

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**Mutual Obligation**

1. This MoU may be terminated by either party through a notice of one month. Either party will be liable to provide reason and a notice of 15 days in which period if the necessary action is not taken then either party can terminate the agreement.
2. This agreement may not be amended without the prior written consent of both the parties.
3. Neither party shall issue any press release, public announcement or other such disclosure concerning this agreement without the other party's consent as to such release or announcement.
4. SPIT will sign a Non Disclosure Agreement (NDA) necessitated to protect IPR and essential information safeguards from both sides.
5. Intellectual Property Rights: IPR titles or ownership of any products, proprietary information or technology tools, processes, utilities, and methodology including any Zeuva proprietary products or components thereof used hereunder or development of any deliverables and all new ideas, inventions, innovations, or developments conceived, development or made by Zeuva hereunder will not be transferred from Zeuva to the Institute on account of use of the same as part of any work under this MoU and shall always remain with Zeuva.
6. Zeuva will share hardware and firmware design with SPIT. SPIT will ensure that this is not shared with anyone outside the identified subject matter experts. Also in no circumstances will these designs be used for any purpose other than for providing technical guidance.

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## Summary

Zeuva recognizes the significance of SPIT initiative to be the leader in the field of Education in Electronics, Communiocation and Computer Engineering and academia in the country. Zeuva proposes to provide an opportunity to the SPIT faculty and students to work on live projects and learn the necessary skill-set essential as per the new technological trends in the country.

This Memorandum of Understanding is intended to express the broad understanding of the parties regarding their working with each other to the extent possible for their mutual benefit.

In written whereof both parties put their hard seal on the day, month and year herein mentioned.

Date: November 29, 2018

Principal

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Bhavan's Campus, Munshi Nagar

Andheri (West), Mumbai-58

E-mail: principal@spit.ac.in

Telephone: (022) 26708520 Ext: 305

Signature:

Mrs. Dr. Prachi Gharpure

For SPIT, Mumbai

Director,

**Zeuva Automotive Private Limited** (Zeuva), B Wing, 5th Floor, Ackruti Trade Center, MIDC, Andheri (East), Mumbai-93

Signature:

For ZEUVA AUTOMOTIVE PVT. LTD.

Director

Mr. Nishant Ranjan

For Zeuva, Mumbai

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