विज्ञान एवं प्रौद्योगिकी विभाग
DEPARTMENT OF
SCIENCE & TECHNOLOGY
सत्यमेव जयते

G-TEC
DST GITAM- Technology Enabling Centre

GITAM
(DEEMED TO BE UNIVERSITY)
(Estd.u/s 3 of the UGC Act, 1956)
VISAKHAPATNAM • HYDERABAD • BENGALURU
NAAC A++ ACCREDITED

GITAM TECHNOLOGY ENABLING CENTRE

NEWSLETTER

VOLUME 1

JANUARY 2024

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TDT Division

Dear Readers,

It is with great pleasure and enthusiasm that I welcome you to the first edition of the GITAM Technology Enabling Center (G-TEC) Newsletter. As we navigate the ever-evolving landscape of technology and innovation, this publication stands as a testament to our commitment to excellence and progress.

In the fast-paced world of technology, staying informed is key to staying ahead. This newsletter serves as a gateway to the latest developments, our collaboration with industries and academic institutions, technologies mined and technology transfers done at G-TEC.

I extend my heartfelt appreciation to Dr. Anita Aggarwal, Scientist, TEC Program Coordinator, Department of Science and Technology, GoI; Dr. Krishna Kanth Pulicherla, Scientist, TEC Program Coordinator, Department of Science and Technology, GoI; Prof. K. Sankaran, Director, Centre for Biotechnology, Anna University, Chennai and all the other Program Advisory Group (PAG) members, who have contributed their time, expertise, and passion to make G-TEC a hub of technological excellence. Your collective efforts propel us forward, and this newsletter is a showcase of the remarkable journey we are on together.

As we continue to foster an environment that nurtures creativity and exploration, this newsletter becomes a shared space for knowledge exchange. It is a platform to celebrate achievements, share experiences, and inspire each other to reach new heights.

Thank you for your continued support, and I look forward to witnessing the continued growth and success of the GITAM Technology Enabling Centre.

Best Regards,
Prof. Raja P Pappu
Coordinator
DST - GITAM Technology Enabling Centre

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G-TEC Inauguration at Gitam Deemed to be University

On 2nd June 2023, our prestigious project DST GITAM Technology Enabling Centre (G-TEC), was inaugurated by Shri Atul Bhatt, CMD Vizag Steel, in the presence of Shri M. Sribharat, President, GITAM; Prof. Dayananda Siddavattam, Vice-Chancellor, GITAM Deemed to be University; Dr. Krishna Kanth Pulicherla, Scientist, DST; and Prof. K. Sankaran, Director, Centre for Biotechnology, Anna University, Chennai.

In a moment of great pride, GITAM Deemed to be University has been selected by DST to establish the Technology Enabling Centre for Andhra Pradesh. The focus of the centre will be on providing an enabling ecosystem, process, and support system.

Twenty prominent academic representatives and fifteen industry leaders from Visakhapatnam and the surrounding areas attended. Without question, their attendance has added to the event's success and significance. This event served as a platform for both industry and academia to share their insights, expertise, and knowledge.

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Thrust Areas of GITAM – Technology Enabling Centre:

- Smart Technology
- Agri Tech
- Health Tech
- Toys
- Food Technology
- Material Science
- Waste Management

Achievements of G-TEC"

16
MoU's with Academia

6
MoU's with Industries

543
Technologies identified

32
Technologies mined

1
Technologies transferred

7
Capacity building for Industry/Academia

The signing of a Memorandum of Understanding (MoU) between G-TEC and industries

The signing of a Memorandum of Understanding (MoU) between industries and G-TEC is a significant milestone that fosters collaboration and partnership between these entities. The MoU serves as a formal agreement that outlines the terms and conditions of cooperation, setting the stage for joint initiatives and shared goals.

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S.no	Name of Industry	Date of signing	Focus Area
1.	Rosys Virtual Solutions	2nd June 2023	Drone technology
2.	Peelon Inc	2nd June 2023	Biodegradable solutions
3.	Innovare Labs	30th June 2023	Pharmaceuticals
4.	Avni Organics	10th August 2023	Organic farming
5.	Akshayaanu Green Solutions	11th August 2023	Liquid & Solid Was -te Management
6.	INDQ (Inkoolu - Design Private Limited)	20th Dec 2023	Food Processing & Technology Agriculture Aqua Culture Industrial Biotech- -nology

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The signing of a Memorandum of Understanding (MoU) between G-TEC and Academic Institutions

The formalization of a Memorandum of Understanding (MoU) between Academia and G-TEC represents a momentous achievement that nurtures cooperation and alliance between these institutes. This MoU acts as a binding agreement that defines the terms and parameters of collaboration, paving the way for collaborative research and projects with common objectives.

Memorandum of Understanding(Mou)

S.no	Name of Institutes	Date of signing
1.	MVGR College of Engine -ering,Vizianagaram	2nd June 2023
2.	Avanti Engineering College, Visakhapatnam	12th June 2023
3.	GIET, Rajahmundry	1st July 2023
4.	Gayatri Vidya Parishad College of Engineering, Madhurawada, Visakhapatnam	27th July 2023
5.	Baba Institute of Techn -ology and Sciences	10th August 2023
6.	Anil Neerukonda Institute of Technology &Sciences Tagarapuvala	24th July 2023
7.	Avanthi Institute of Pharmaceutical Sciences Visakhapatnam	24th July 2023
8.	Viswanadha Institute of Pharmaceutical Sciences	7th July 2023
9.	Vignan's Institute of Engineering for Women	5th Sep 2023
10.	Ramachandra College of Engineering, Eluru	21st August 2023
11.	Sagi Rama Krishnam Raju Engineering College	10th August 2023

S.no	Name of Institutes	Date of signing
12.	Indian Institute of Petroleum and Energy	12th Sep 2023
13.	Miracle Educational Society Group of Institu -tions	21st August 2023
14.	GMR Institute of Technology (GMRIT)	10th August 2023
15.	Santika Vidya Parishad Engineering College	21st August 2023
16.	Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology	18th Nov 2023

National Technology Day

GITAM Technology Enabling Centre (G-TEC) organized an event on National Technology Day on 11th May 2023. Mr. Harish Mehta, the esteemed founder of NASSCOM (National Association of Software and Service Companies), graced the occasion as the chief guest. During his session, Mr. Mehta shared his valuable views and insights on how NASSCOM has played a pivotal role in revolutionizing the Information Technology (IT) industry in India.

One of the key highlights of Mr. Mehta's talk was the emphasis on collaboration with competitors as a means to foster innovation and enhance human well-being. He stressed the importance of working together with other players in the industry, rather than viewing them as adversaries. According to him, this collaborative approach not only leads to increased innovation but also contributes to the overall well-being of individuals and society as a whole.

The session organized by G-TEC provided an excellent platform for the audience to gain insights from Mr. Harish Mehta's vast experience and knowledge. His talk highlighted the significant contributions made by NASSCOM in transforming the Indian IT industry and the importance of collaboration for driving innovation and societal well-being.

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TEC Conclave – Hyderabad

The DST-Technology Enabling Centre at the University of Hyderabad (DST-UoH-TEC) organized a 2-day TEC-Conclave-2023 on the 17th and 18th of April 2023. This conclave is intended to review the progress of TECs created by the Department of Science and Technology (DST), Government of India, in 22 universities spanning across the nation. The Coordinators and Co-coordinators of all the TECs attended the conclave and there were about 50 participants in the meeting.

AR/VR Workshop - Coding Virtual Worlds

G-TEC, in collaboration with CXR-GITAM, recently organized an engaging and remarkable workshop titled "Coding Virtual Worlds." The primary objective of this workshop was to provide a platform for students to learn and expand their understanding of game development and virtual reality (VR) development. The event proved to be a resounding success, empowering participants with valuable skills and knowledge in these cutting-edge fields.

The workshop was inaugurated virtually by Shri Atul Bhatt, CMD (Chairman and Managing Director) of Vizag Steel, adding prestige and significance to the event. Shri Atul Bhatt's presence and support underscored the importance of fostering technological education and innovation among the student community.

During the workshop, the participants had the opportunity to create various projects in the realm of VR and video games. These projects encompassed a range of experiences, including a Shooting Game, Escape Room, Meditation Poses, Feeding Animals, and Forest Environment. Through hands-on development of these projects, the participants were able to gain practical experience and deepen their understanding of AR/VR technology.

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Session on ‘Intellectual property rights’

The GITAM Technology Enabling Centre (G-TEC) organized an enlightening and informative session titled "Lab to Market - Leveraging IP." This session was conducted as a part of the #RashtriyaBoudhikSampadaMahotsav and #AzadiKaAmritMahotsav IP Festival, which took place on July 21, 2023.

The event received 700 registrations and 421 participants joined via Zoom, it was a diverse audience comprising academicians, researchers, and students from Andhra Pradesh.

The expert speaker for this session was Ms. Nitin Shukla, who serves as the Head of the IP Group at CSIR-NCL (Council of Scientific and Industrial Research - National Chemical Laboratory). Ms. Shukla's extensive expertise and insights in the field of intellectual property (IP) made her a valuable resource for the event.

The event aimed to shed light on the critical aspects of intellectual property, particularly its role in translating laboratory innovations into marketable products and solutions. It served as a platform for knowledge sharing, networking, and fostering a deeper understanding of IP-related challenges and opportunities in the context of innovation and entrepreneurship.

This session exemplified the commitment of G-TEC, CSIR, and other key stakeholders to promote a culture of innovation, research, and IP awareness. It provided a valuable opportunity for participants to gain insights from industry experts, fostering an environment conducive to the transformation of innovative ideas into tangible products and services. Ultimately, this event contributed to the larger goals of advancing research, innovation, and the entrepreneurial spirit within the region and beyond.

Leveraging IP

G-TEC Anusandhan – A Technology Forum for Academic Institutions

G-TEC Anusandhan, which took place on August 29th, emerged as an enriching and collaborative platform. This symposium served as a significant gathering where 16 academic institutions converged to share, deliberate, and enrich their understanding of the latest innovations and cutting-edge technologies.

The symposium provided a fertile ground for academicians from various educational institutions to come forward and present technological advancements that were poised for commercialization. This presentation of practical and innovative solutions highlighted the event's practical orientation, with an emphasis on transforming ideas into tangible products services.

The symposium provided a fertile ground for academicians from various educational institutions to come forward and present technological advancements that were poised for commercialization. This presentation of practical and innovative solutions highlighted the event's practical orientation, with an emphasis on transforming ideas into tangible products and services.

The symposium showcased around 30 technologies along with insightful keynote speeches, interactive panel discussions, and valuable networking opportunities. These elements collectively fostered an environment where academic leaders could engage with their peers, exchange perspectives, and establish connections.

In summary, G-TEC Anusandhan was more than just a symposium; it was a dynamic platform that encouraged knowledge sharing, collaboration, and forward thinking. It provided a space to delve into emerging trends, exchange innovative ideas, and establish meaningful collaborations, all of which contribute significantly to advancing the fields of education and technology. This event played a crucial role in building a network of academic leaders poised to make a lasting impact on these domains.

Technologies mined

1. Food Spoilage Detection System in Refrigerators

Figure –Working Model

Introduction:

Almost in every household, there will be some food hidden in the refrigerator which will get spoiled and turn its colour and start smelling due to the formation of bacteria which will be detected by people after a long time and needs to be disposed of.

Applications:

i. The system can detect food spoilage at an early stage by detecting the presence of methane gas, which is an indication of food spoilage.

ii. The system provides multiple alerts, including visual (red LED indicator), audible (buzzer indicator), and digital (GSM module) alerts, which ensure that the user is notified of spoiled food.

iii. The system is cost-effective compared to other food spoilage detection systems available in the market. The components used in the system are affordable and easily available.

iv. The system is reliable and accurate in detecting food spoilage. The MQ4 Methane Sensor has a high sensitivity and accuracy in detecting methane gas, which ensures that the system is reliable.

v. The system helps prevent potential health hazards by alerting the user to take appropriate action when food is spoiled.

vi. The GSM module used in the system allows for wireless alerts to be sent to the user's phone, ensuring that the user is notified even when they are not in close proximity to the system.

vii. The system can be customized to fit the user's specific needs, such as adjusting the sensitivity of the sensor or changing the type of alerts used.

Salient Features:

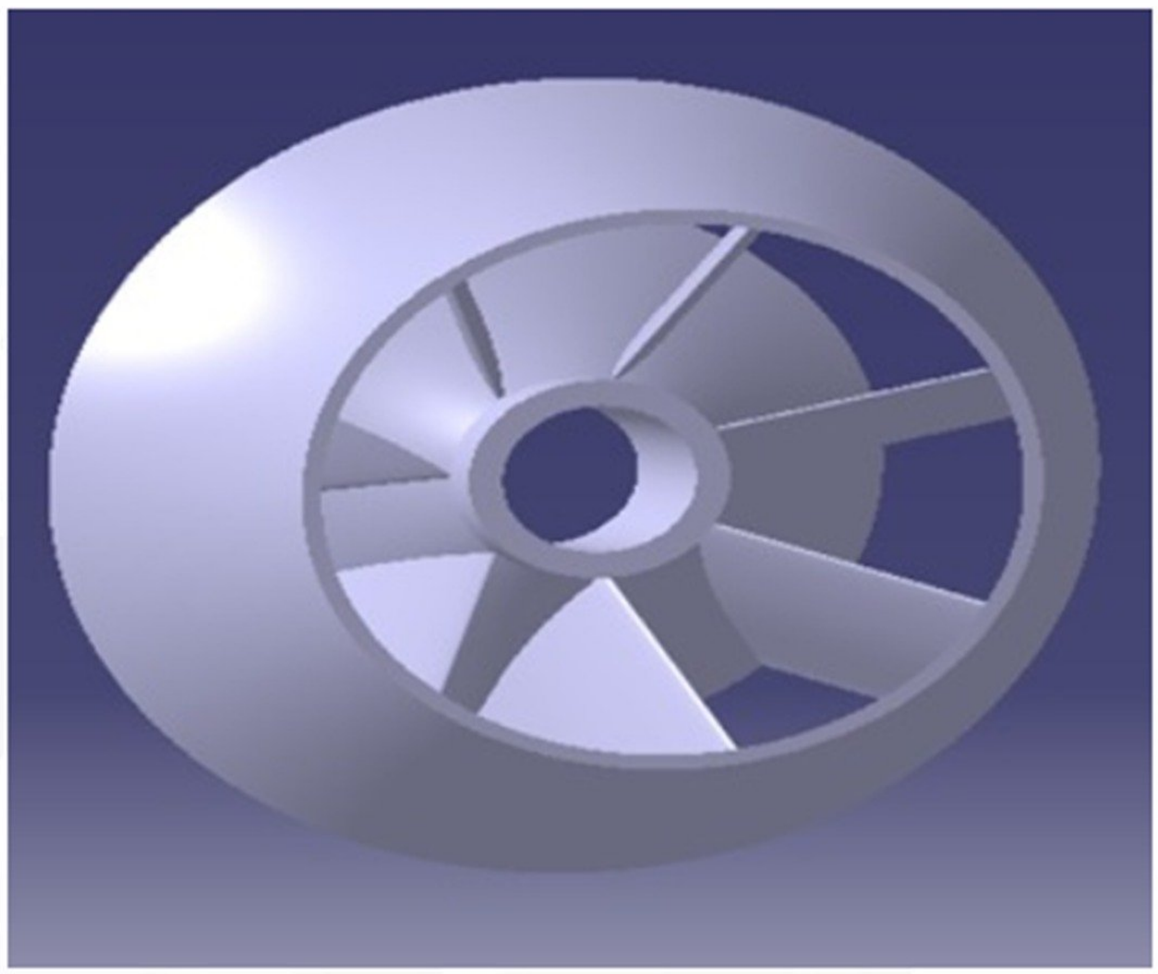
i. Whenever the Methane sensor detects Methane gas levels above a certain threshold, it sends a signal to the Arduino Uno microcontroller.

ii. It will then trigger the LED and Buzzer indicators to alert the user

iii. The GSM module is also activated, sending a message to the user's mobile phone to notify them of the potential food spoilage.

TRL Level: 05

2. Low noise fibre reinforced air-mover



Introduction:

This is a novel design of an air mover integrated with a fibre-reinforced composite in the field of air movement technology. This invention addresses a critical global concern regarding acoustic emissions and noise pollution caused by turbo machines, especially axial air movers.

Application:

i. A perfect solution for industrial as well as commercial ventilation systems. Its quiet operation, energy efficiency, and durability make it an ideal choice for maintaining a healthy and productive work environment.

ii. Retail stores, restaurants, and office buildings often require effective ventilation systems that do not disrupt the ambiance. This air mover can be seamlessly integrated into such spaces, ensuring optimal air circulation without disturbing customers or employees.

iii. Heating, ventilation, and air-conditioning systems (HVAC) play a crucial role in indoor comfort. By incorporating our low-noise air mover, HVAC systems can achieve enhanced efficiency and reduced noise levels, contributing to a more pleasant living or working environment.

iv. Beyond traditional applications, our innovation finds utility in various sectors. From marine environments like boats and ships to controlled environments like greenhouses and animal shelters, the Low-Noise Fiber Reinforced Air-Mover offers noise reduction without compromising performance.

v. Sensitive environments like data centers and laboratories demand precise temperature control and minimal noise disturbance. Our invention can be tailored to meet the unique requirements of these settings, ensuring optimal performance
while maintaining a tranquil atmosphere

Salient features:

i. The Low-noise fibre-reinforced air-mover combines innovative design principles with the application of a specially developed fibre-reinforced composite.

ii. This composite material not only enhances structural integrity but also acts as a noise-dampening element, absorbing and reducing sound waves generated during operation.

iii. The result is an air mover that maintains or even improves aerodynamic efficiency while emitting significantly less noise.

TRL Level: 07

3.Instant Cooling and Heating Technology

Introduction:

Changes in climate can alter the water temperature, often necessitating a waiting period to achieve the ideal drinking temperature. This innovation, however, will automatically adjust the water temperature to meet the specific climatic requirements, eliminating the need for waiting.

Applications:

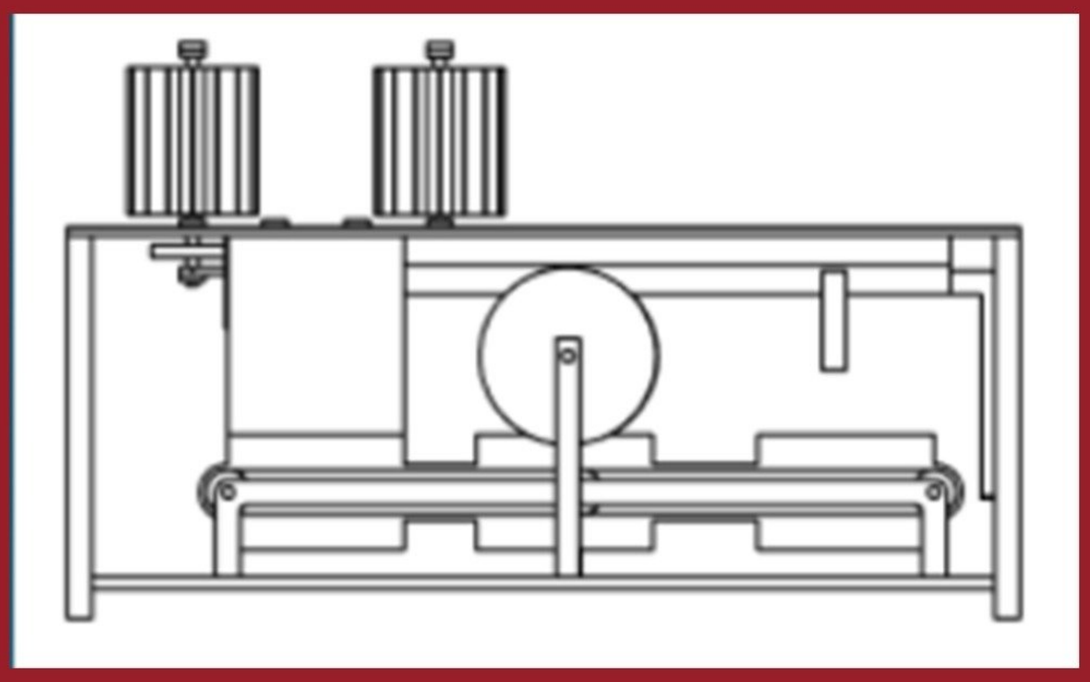
i. Instant cooling can be especially valuable during outdoor activities like hiking, camping, or picnics. It allows users to enjoy a chilled water on a hot day or a warm water in chilly conditions, enhancing the overall experience.

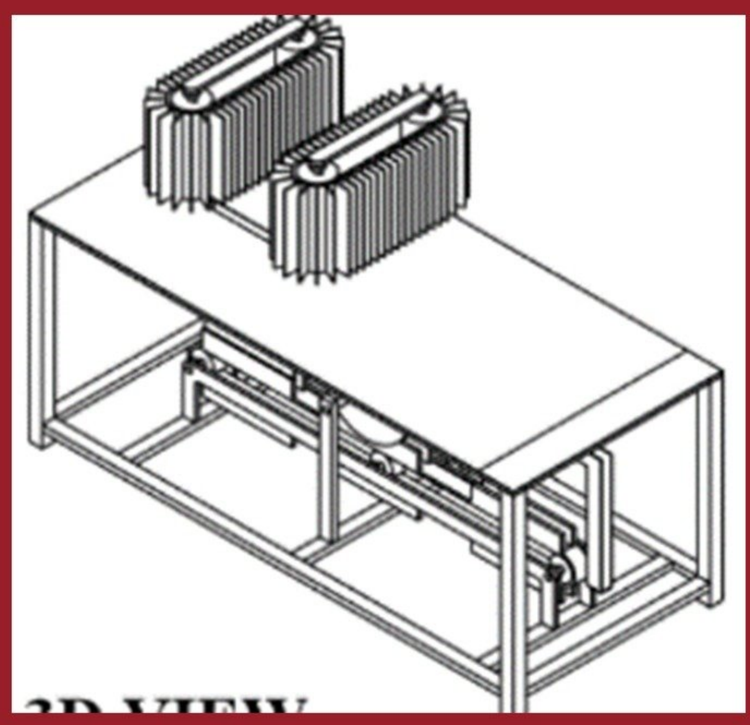
ii. Athletes and fitness enthusiasts can benefit from the technology to quickly cool down with a cold drink after a workout.

iii. The ability to cool or heat the beverage within the bottle reduces the need for energy-consuming appliances like refrigerators or electric kettles, making it an eco-friendly solution

TRL Level: 09

4. A Fully Automatic Dishwasher Apparatus





Introduction:

This is a completely automated dishwasher designed to accommodate Indian cooking styles. The plan involves developing prototypes, then moving on to full-scale production of a functional product. Subsequently, the product will undergo customer testing, and any feedback received will be integrated to implement essential enhancements.

Application:

i. The Fully Automatic Dishwasher is a Home Appliance device.

ii. It has applications in Homes, Restaurants, hostel messes, Function Halls, and Industries where dish-type fixtures/plates

Salient features:

i. It is specifically designed from an Indian point of view, to clean the oily substances sticking to dishes.

ii. It reuses and recycles the used water hence less water is consumed.

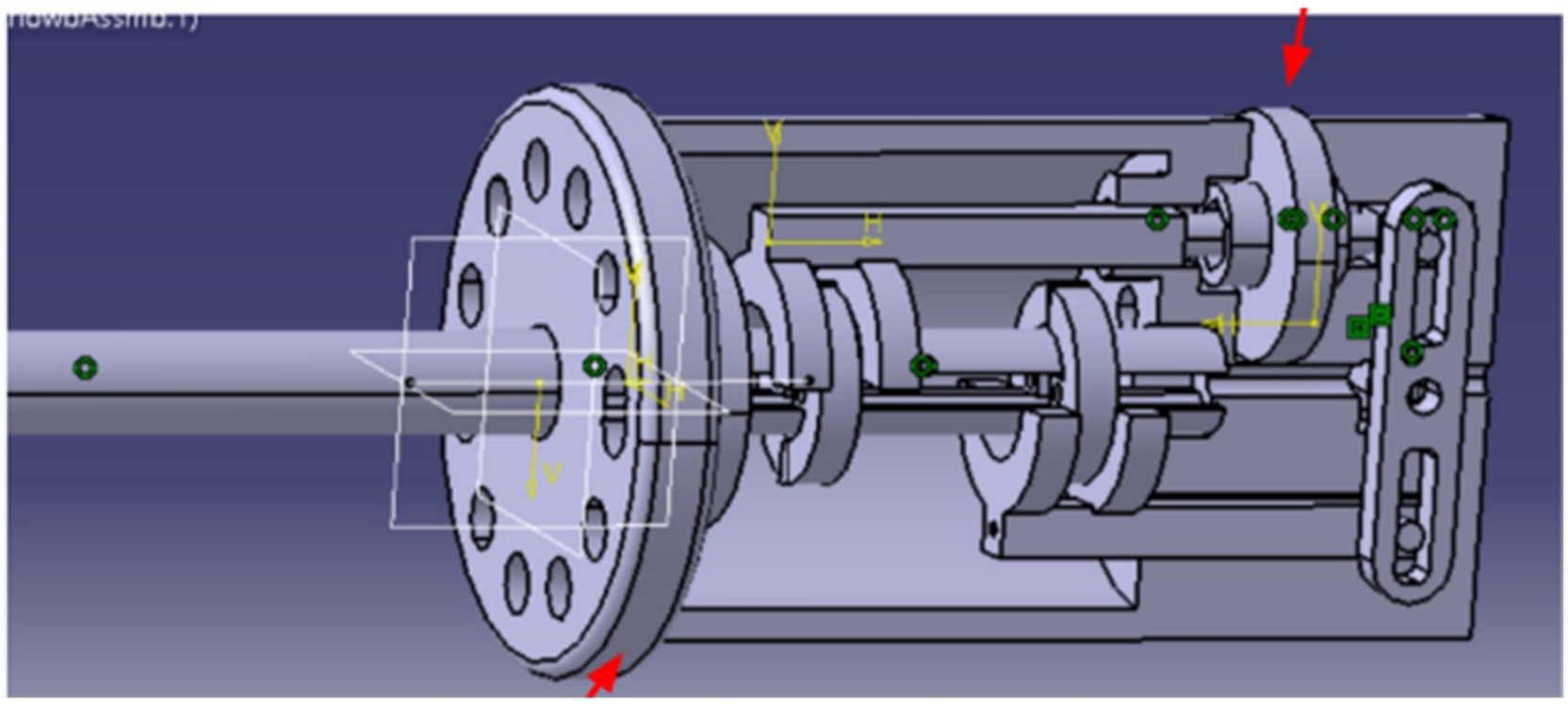
iii. Existing dishwashers use only water spray for washing limited dishes stored in the chamber.

iv. Proposed invention scrubs dishes from both sides and dishes keep sliding and moving continuously.

v. As dishes are stacked on top of the machine it continuously goes on washing. While dishes are being washed a fresh stack can be loaded on top without stopping the machine.

TRL Level: 05

5.Handle with a mechanism to bend the joint and to axially rotate the long rod



Introduction:

This novel laparoscopic apparatus empowers surgeons with greater intraoperative dexterity, potentially revolutionizing minimally invasive procedures.

Application:

i. Surgeons can use the apparatus to perform complex surgical procedures with higher precision and control, allowing for more intricate tasks during minimally invasive surgeries

ii. the apparatus can improve the performance of procedures minimizing patient discomfort and recovery time.

iii. Surgeons can utilize the apparatus to enhance the accuracy and efficiency of the procedures.

iv. The device can be adapted for use in pediatric surgeries, making it possible to address congenital abnormalities

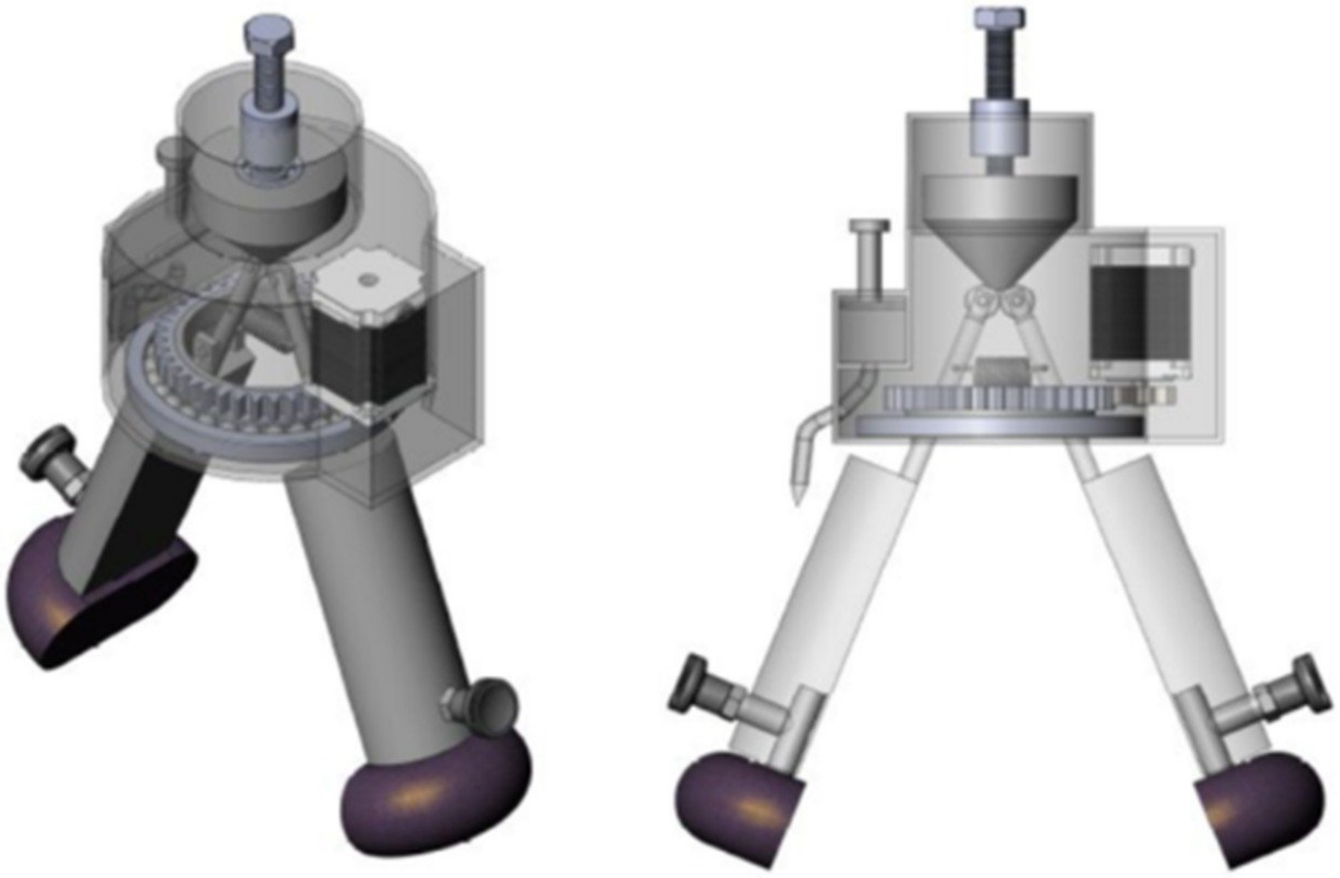
v. The apparatus can also serve as a valuable tool for surgical training and medical research, allowing practitioners to refine their skills and explore new techniques in a controlled environment.

Salient features:

i. Enhanced Precision
ii. Greater Range of Motion
iii. Improved Visualization
iv. Minimized Tissue Trauma
v. Reduced Surgical Time

TRL Level: 04

6.A Portable Semi-Automatic Utensil Cleaner Apparatus



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Introduction:

To save time, energy and money there is a need of a simple aid for manual vessel cleaning operation. The proposed invention offers these benefits to the user. It's very simple, light weight, easy to handle and very less expensive.

Application:

i. The device is ideal for everyday household dishwashing, offering hands-free scrubbing action and efficient stain removal. It simplifies the cleaning process for users.

ii. The device is suitable for cleaning laboratory glassware and equipment, ensuring thorough and consistent cleaning without the need for manual scrubbing.

iii. In healthcare settings, the device can enhance the cleaning of medical instruments and equipment, promoting hygiene and reducing cleaning time.

iv. Food processing facilities can use the device for cleaning various vessels and containers, maintaining strict hygiene standards in the industry.

Salient Feautures:

i. Its compact and lightweight design ensures portability, allowing users to clean utensils conveniently at various locations, including outdoor events or smaller kitchens.

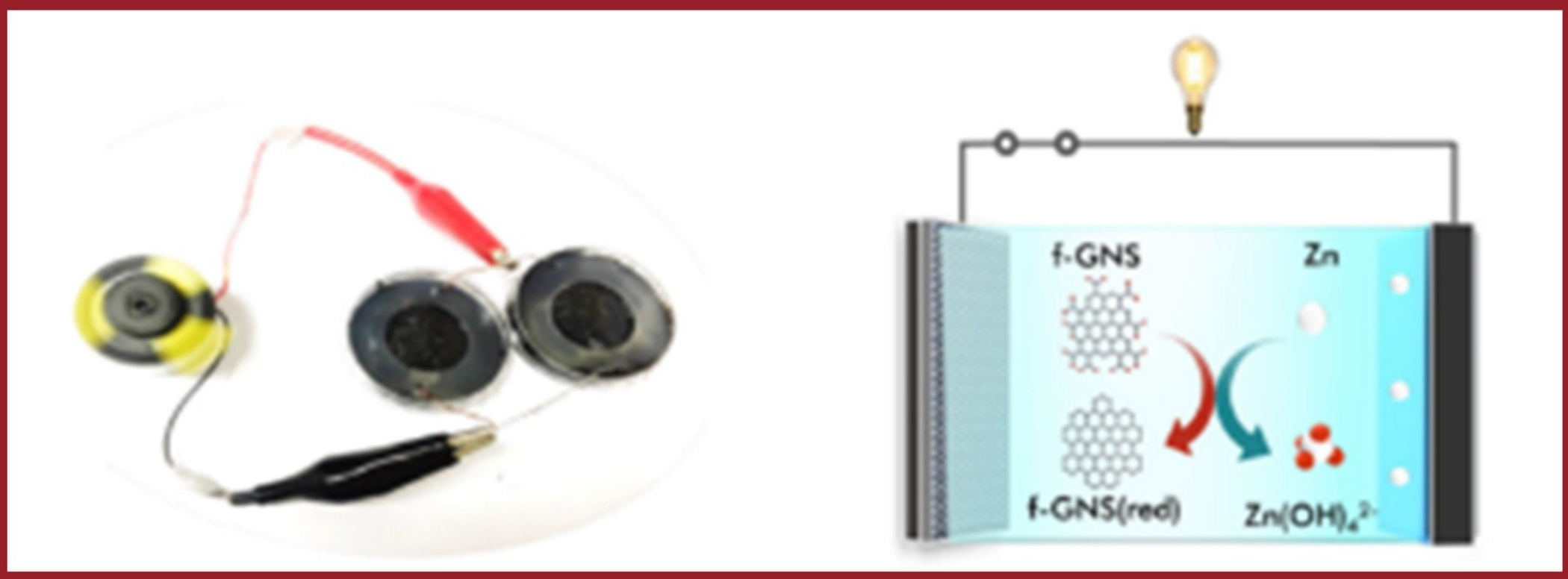
ii. The apparatus reduces cleaning time significantly, enabling quick and efficient cleaning of a variety of utensils.

iii. It is designed to use minimal water and energy, promoting environmental sustainability and cost savings.

iv. The apparatus provides thorough and effective scrubbing to remove tough stains and food residue from utensils.

TRL Level: 04

7. Biomass-Based Functionalized Graphene for Self-Rechargeable Zinc-Air Batteries



Introduction:

Commercial batteries are typically charged with electrical power systems and consume electrical energy for recharging. Chemically self-charging batteries are a class of electrochemical devices that use chemical reactions to recharge batteries without electrical grids.

Herein, we report the fabrication of a self-rechargeable zinc-air battery that is capable of simultaneously harnessing and storing energy based on biomass-derived functionalized graphene nanosheets (f-GNS).

Salient features:

i. The self-rechargeable ZABs demonstrate the potential to harvest the reversible redox energy of f-GNS for powering electronics.

ii. Electric energy is generated directly by the conversion of oxygen and moisture into stored chemical energy by the so-called artificial respiration, a chemical process that replicates aerobic respiration.

iii. The self-rechargeable ZABs can produce a considerable amount of power as high as ⊠250 mW cm-2 .

iv. When connected in series and parallel, the self-rechargeable ZABs can continuously light an LED and drive a motor, respectively.

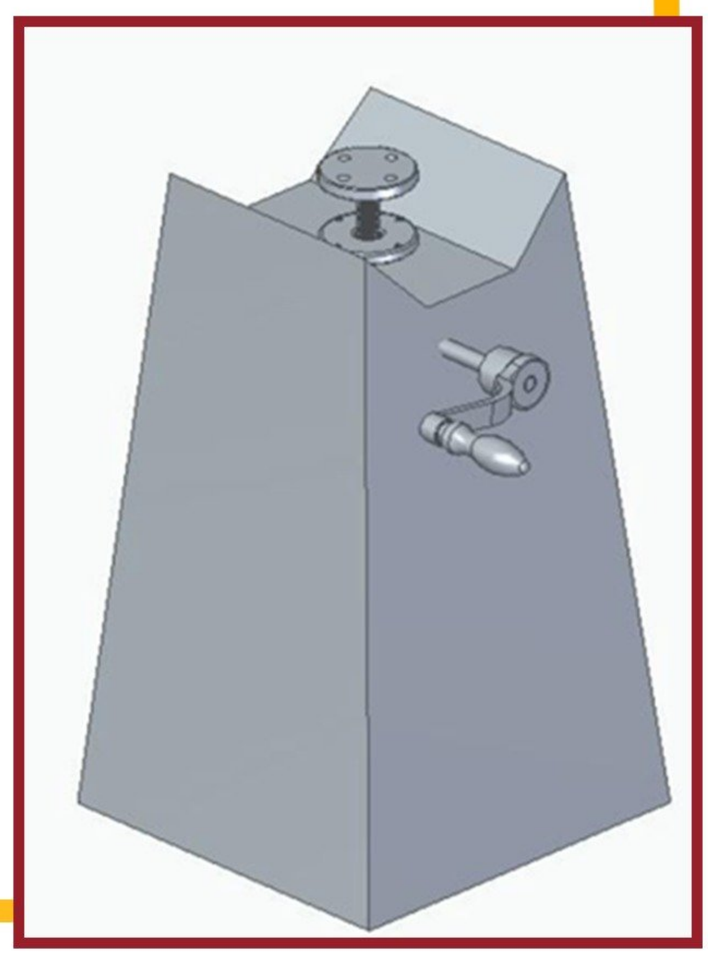
TRL Level: 07

Technologies Transferred

Re-Adjustable and Movable Indicator Assistance (RAMIA) transferred to Gas Authority Of India Ltd. (GAIL)

GITAM's ToT to GAIL

GITAM Deemed to be University Technology Enabling Center (G-TEC) recently transferred a patented technology to GAIL (India) Ltd. The new technology was developed by G-TEC Assistant Manager and Mechanical Engineering expert **Dr.Karaka Chandra Mouli** for levelling gas pipelines on rough terrains and named it "Re-adjustable and movable indicator assistance (RAMIA)". GAIL (India) Limited Chief General Manager (O & M) & OIC Vizag-Secunderabad LPG Pipeline **Mr. LS Rao** along with his team **Mr. Stephen** and **Ms.Vijayalakshmi** participated in the Technology Transfer event.



This innovation pertains to the realm of lifting and positioning equipment designed for gas pipelines and similar structures. It offers a cost-effective alternative to the traditional sandbags technique for the leveling and stabilization of pipelines.

It serves as a purposeful solution to eliminate hazardous conditions, provides moisture resistance, and offers the convenience of portability for use at different work site locations.

This device is a portable and adjustable lifting apparatus capable of accommodating load capacities ranging from 5 kN to 1000 kN, thus addressing various pipeline requirements.

Application:

This innovation serves as both a temporary and permanent support structure for underground pipelines.

This device can be buried underground for extended durations without succumbing to moisture absorption, making it resilient to various weather and terrain conditions.

In shale areas, it offers a forward-looking solution for temporary structures and can be employed as a foundational pillar for constructing temporary dwellings.

Its applications extend to underwater environments, where it acts as a dependable support system for pipeline passage.

The device not only levels gas pipelines but also safeguards them from corrosion during prolonged contact.

Featuring a self-locking mechanism and a linear elevation and descent system, it can handle loads exceeding 7 tons in capacity.

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