

THE SCIENCE OF MAKING...

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TECHNICAL ACHIEVEMENTS

➤ EVALUATION OF WING ACTUATOR WITH INDIGENOUS FUEL

The Aerospace Laboratory at CMTI, conducted a comprehensive performance evaluation of a fin actuator using the indigenous aviation fuel DMS-BM-02, developed by DMSRDE. A series of rigorous environmental and functional tests were carried out at CMTI using a dedicated actuator test rig.

In a critical evaluation, the performance of the indigenised fuel was compared with that of imported Jet A-1 fuel, using an imported Russian actuator under extreme operating conditions. The actuator was tested at a temperature of 270 °C and a rated pressure of 180 bar to simulate the demanding environment of missile operations.

The tests validated that the indigenous fuel performed on par with the imported fuel, marking a significant step towards fuel indigenisation and self-reliance in strategic defence systems.



NEW INITIATIVES

➤ CMTI'S OUTREACH AND FIELD INTERACTION AT SKUAST-KASHMIR AND PROJECT KICK-OFF MEETING FOR "TECH WALNUT SMART AUTOMATION-BASED WALNUT INDUSTRY", UNDER AGRI-EXCELLENCE PROGRAMME-MEITY



Ministry of Electronics and Information Technology (MeitY), Govt of India has approved a joint Agri-Excellence programme involving CMTI, SKUAST-K, C-DAC, Kolkata, and CMERI for Himalayan Region Crop Management. Under the Programme, CMTI, in collaboration with SKUAST-K and C-DAC, is developing AI-enabled smart mechanised equipment and smart solutions for walnut production. As per identified roles, CMTI is responsible for developing key prototypes such as a smart walnut harvester, an automated segregation system, and a size and colour sorting system. C-DAC will develop a rapid aflatoxin detection system for walnut kernels

while SKUAST-K will provide essential technical inputs to support field deployment. To gather field data and technical inputs from SKUAST-K, a team of scientists from CMTI, Mr. Prakash Vinod, Mr. Girish Kumar M, Mr. Gopi Krishna S, Mr. Harikrishna S T, and Mr. Manjunath M A—undertook a field visit to Kashmir valley and SKUAST, Srinagar from 22 to 27 June, 2025. Site visits to Kupwara, Kulangam, and Anantnag enabled the team to assess critical parameters such as walnut tree height, stem and branch dimensions, structural strength, terrain conditions, and harvesting system requirements. A brainstorming session was held at SKUAST-K among scientists from CMTI, faculty and researchers from



SKUAST-K, and experts from C-DAC Kolkata to finalize design requirements for the targeted equipment under the project. The interaction with Prof. Nazir Ahmad Ganai, Vice Chancellor, SKUAST-K, and Dr. Haroon Rashid Naik, Director of Research, SKUAST-K, provided deeper insights into the current project expectations and future collaboration opportunities with SKUAST-K.



AI to power Himalayan farming: SKUAST-K leads MeitY's smart agri-tech mission



OK News Service
New Delhi/Srinagar, July 10
The Ministry of Electronics and Information Technology (MeitY), Government of India, has launched an ambitious Agri-Excellence Programme focused on the "Agri-Excellence in Himalayan Region Crop Management". The initiative, aimed at transforming high-value crop farming in the Himalayas, particularly in Jammu & Kashmir, was formally launched in New Delhi. Shree-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K) has been designated the nodal institution for the program, bringing together a consortium of leading national R&D organizations—C-DAC, Kolkata, CSIR-CMERI Durgapur and

Soon after the visit, the kick-off meeting of the Agri-Excellence Programme was held on 9 July 2025 at MeitY, New Delhi, under the chairmanship of Smt. Sunita Verma, Group Coordinator (R&D-E/CCBT). During the meeting, Mr. Manjunath M A, Scientist-D from CMTI Bengaluru, presented the project "TechWalnut", which focuses on developing AI-enabled smart automation solutions for walnut farming in the



Himalayan region. The presentation highlighted key technologies being developed by CMTI, including smart walnut harvesters, automated defect detection and segregation systems, and advanced grading solutions for size and colour sorting. These innovations aim to significantly reduce manual labour, improve efficiency, and enhance the overall quality of walnut produce.

TECHNICAL PRESENTATIONS/CONTRIBUTORY TALKS

➤ CMTI SCIENTISTS PRESENT INNOVATIVE VIBRATION TESTING APPROACH AT FPTs 2025

Mr. Tom Thampy, and Mr. Dattatreya, Scientists from the Aerospace Laboratory at CMTI, presented a technical paper at the Fluid Power Technical Seminar (FPTS) 2025, organized by the Fluid Power Society of India (FPSI). Their paper, titled "An Innovative Approach for Vibration Testing of Axial Piston Pump in Active Mode and Associated Challenges", highlights the design and successful implementation of a customized test setup for vibration testing of pressure-compensated axial piston pumps in active mode. The work addressed several key engineering challenges, including the unavailability of suitable drive motors (electric or hydraulic) capable of operating across a vibration frequency spectrum up to 2000 Hz, the difficulty of achieving mass balancing without compromising the responsiveness of the vibration shaker, and the issue of managing shaft misalignment under dynamic test conditions.

To overcome these hurdles, the team developed an innovative solution involving the use of a flexible shaft to transmit torque from a motor placed outside the shaker system, enabling pump operation at 3000 rpm. A hydraulic circuit was also integrated to facilitate load cycling during vibration trials. This novel approach not only enables active-mode vibration testing but also enhances the reliability and safety of qualification testing for axial piston pumps and other rotary Line Replaceable Units (LRUs) in compliance with stringent aerospace standards.



➤ EXPERT TALKS ON SENSOR TECHNOLOGIES AT SENSEIOT-2025

- Ms. Kusuma N (Scientist-F and Centre Head, C-SVT) and Mr. Harsha S (Scientist-C and Group Head, STDC) delivered virtual expert lectures as part of the "SENSEIoT-2025" workshop series, organized by CDAC Kolkata to promote indigenous sensor and actuator development for the IoT ecosystem.
- On 28 June 2025, Kusuma N presented a session on "MEMS Sensors for IoT" during the 1st International Online Workshop, which saw participation from over 300 attendees.
- On 8 July 2025, Harsha S delivered a talk on "Packaging for Sensors & Microsystems" at the follow-up workshop under the same initiative, also engaging over 300 registered participants.

EVENTS/WORKSHOPS ATTENDED

➤ CMTI SCIENTIST, MR. TOM THAMPY, PARTICIPATES IN CEO BUSINESS MEETING AND AEROSPACE & SPACE EXPO IN JAPAN



Mr. Tom Thampy, Scientist-E and Group Head of the Aerospace Laboratory at the Central Manufacturing Technology Institute (CMTI), participated in the CEO Business Meeting held in Japan from 29 June to 4 July 2025. The visit was facilitated by the Society of Indian Aerospace Technologies and Industries (SIATI), in response to an invitation from the Organization for Small & Medium Enterprises and Regional Innovation (SMRJ), Japan. The event coincided with the prestigious Aerospace & Space Expo hosted in Osaka. During the visit, Mr. Thampy, along with a delegation of Indian representatives, took part in a series of high-level business meetings with leading Japanese companies in the aerospace and manufacturing sectors. These interactions focused on exploring opportunities for bilateral collaboration in aerospace technologies and advanced manufacturing solutions.

CMTI OFFICIALS PARTICIPATE IN THE 'GOLDEN JUBLÉE CELEBRATION OF THE OFFICIAL LANGUAGE DEPARTMENT' AT GMC BALAYOGI INDOOR STADIUM, HYDERABAD

On the occasion of the completion of the 50-year establishment of the Official Language Department, the 'Golden Jubilee Celebration of the Official Language Department' was organized at Official Language Department @50, GMC Balayogi Indoor Stadium, Hyderabad. Shri Venkatachalam G, Chief Administrative Officer, and Shri Raj Bhavan, Senior Hindi Translator-I from CMTI, Bengaluru, were present at the ceremony on 11 July 2025. Hon'ble Deputy Chief Minister of Andhra Pradesh, Shri Pawan Kalyan, inaugurated the ceremony.



CMTI OFFICIALS PARTICIPATE IN THE 'GOLDEN JUBLÉE CELEBRATION OF THE OFFICIAL LANGUAGE DEPARTMENT' AT BHARAT MANDAPAM, NEW DELHI



On the occasion of the completion of the 50-year establishment of the Official Language Department, the 'Golden Jubilee Celebration of the Official Language Department' was organized at Bharat Mandapam, New Delhi on 26 June 2025. Officials from government institutions of India participated in this ceremony. Shri Venkatachalam G, Chief Administrative Officer, and Shri Raj Bhavan, Senior Hindi Translator-I from CMTI, Bengaluru, were present in the ceremony. The ceremony was inaugurated by Hon'ble Shri Amit Shah, Home Minister of India.

CMTI CONDUCTED ONE DAY WORKSHOP ON "ADVANCES IN MANUFACTURING EXCELLENCE" AT SETU FOUNDATION, SURAT

On 5 July 2025, the Setu Foundation in Surat, in collaboration with the Central Manufacturing Technology Institute (CMTI) and the Ministry of Heavy Industries (MHI), organized a one-day workshop on "Advances in Manufacturing Excellence." Dr. Nagahanumaiah, Director of CMTI, was the Chief Guest for the event. The workshop featured expert talks by CMTI scientists including Shri Prakash Vinod, Shri Anil Kumar, Shri Saravanan, Smt. Khushboo, and Shri Gopi Krishna. The sessions covered a wide range of topics such as smart manufacturing and Industry 4.0, aerospace test rigs and LRU development, special purpose machine design and its challenges, quality and metrology innovations, principles and foundations of precision machine design, and skill development for advanced manufacturing. The event facilitated meaningful knowledge exchange and highlighted CMTI's continued commitment to advancing manufacturing technologies in India.



EVENTS/ WORKSHOPS/VISITS AT CMTI

OFFICIALS FROM M/S MUNITIONS INDIA LIMITED VISIT CMTI FOR TECHNICAL DISCUSSIONS AND FACILITY REVIEW



Shri Rakesh Ojha, Director (Operations) and Shri. Ashok Kumar, Executive Director from M/s Munitions India Limited (MIL) visited CMTI on 1 July 2025 for the discussion on their requirements & to witness the facilities at CMTI. The officials were provided with a comprehensive briefing on the various

activities undertaken at CMTI. They were briefed about High-Speed Shuttle Less Rapier Loom & Twin-Screw Mixer Extruder indigenously designed and developed by CMTI and were apprised of the associated technologies. They visited key groups of CMTI viz, Vision group, Sensor Technology Development Centre, Precision Metrology Lab., Smart Manufacturing Development & Demo Cell & Nano Manufacturing Technology Centre. Subsequently, a meeting was convened with the MIL officials, during which the proposals submitted by CMTI were formally presented and discussed.

'HINDI WORKSHOP ON SCIENCE' CONDUCTED FOR THE STUDENTS OF JAWAHAR NAVODAYA VIDYALAYA

To emphasize the significance of using Hindi in the field of science, a "Hindi Workshop on Science" was organized for the students of Jawahar Navodaya Vidyalaya, Doddaballapur, Bengaluru Rural, on 7 July 2025. The event featured insightful lectures in Hindi by Shri Ajay Jaiswal, Scientist-B, CMTI; Smt Khushboo, Scientist-D, CMTI; Shri Vishal Sharma, CMTI; and Shri Anil Kumar, Scientist-D, CMTI, on different scientific topics. Guest speakers Smt Madhulika and Shri Iqbal Ahmed from ICTS, Bengaluru, engaged the students with an interactive science quiz and a live demonstration on cloud condensation. The students actively participated with great enthusiasm and curiosity, making the workshop a meaningful and engaging experience.

85TH LIBRARY COMMITTEE MEETING HELD AT CMTI

On 11 July 2025, the 85th Library Committee Meeting was held at the CMTI Library. Chaired by Mr. Niranjana Reddy, Joint Director and Centre Head, the meeting focused on initiatives to promote readership and improve the organization of journals and books within the library.



85th Library Committee Meeting held on 11th July 2025 at Library, AEAMT

CMTI HOSTS ONE-DAY RASHTRIYA KARMAYOGI JAN SEVA PROGRAM

On 11 July 2025, CMTI successfully organized a one-day Rashtriya Karmayogi Large-Scale Jan Seva Program, coordinated by the AEAMT group. The event was conducted as part of the Government of India's Mission Karmayogi initiative, aimed at promoting citizen-centric service delivery and capacity building among public sector employees.

The program witnessed active participation from CMTI employees, who engaged in various sessions focused on enhancing efficiency, service orientation, and accountability in public service. The event also featured discussions on the core principles of the Karmayogi mission and its relevance to institutional growth and national development.



One-day Rashtriya Karmayogi Large Scale Jan Seva Program held at Central Manufacturing Technology Institute, Bengaluru on 11 July 2025

BUSINESS INITIATIVES/MOU/NDA

- M/s. CMTI and M/s. Micromatic Grinding Technologies Pvt. Ltd. entered into an NDA for the purpose of availing manufacturing and assembly services
- M/s. CMTI and M/s. Trusted Aerospace Engineering Pvt. Ltd. entered into an NDA pertaining to the inspection of machined parts

TRAINING INITIATIVES

➤ EXCLUSIVE TRAINING PROGRAMME ON MICRO & NANO MACHINING FOR RAMCO INSTITUTE OF TECHNOLOGY

An exclusive two-day training programme on “Micro & Nano Machining” was organized for the faculty and students of Ramco Institute of Technology from 2 to 3 July 2025. The programme was coordinated by Shri Karthik M S, Scientist-C, and aimed to provide a comprehensive understanding of advanced machining technologies through a blend of lectures and hands-on demonstrations. Day 1 commenced with an introductory session on micro and nano machining, followed by technical lectures on conventional precision machining processes, micro machining techniques, and laser micro-machining. These sessions were reinforced through live demonstrations, offering participants practical exposure to the concepts discussed. The second day featured expert sessions on single point diamond turning, non-traditional micro machining, surface coatings, and nano finishing processes. Participants also witnessed detailed demonstrations on nano finishing, diamond turning and non-traditional machining techniques. The programme culminated with a live demonstration on advanced characterization and inspection methods, followed by a concluding session involving all participating faculty members. The training programme offered a well-rounded perspective on state-of-the-art micro and nano machining technologies, effectively bridging theoretical foundations with practical implementation. The event was highly appreciated by the participants for its depth, technical relevance, and interactive learning approach.



➤ TRAINING PROGRAMME ON CALIBRATION OF DIMENSIONAL MEASURING EQUIPMENT



CMTI, Bengaluru, conducted a five-day training programme on “Calibration of Dimensional Measuring Equipment” from 7 to 11 July 2025. Coordinated by Mrs. Khushboo, Scientist-D, the programme aimed to provide in-depth knowledge and practical exposure to participants on various dimensional metrology tools and calibration techniques. The sessions covered key topics including introduction to calibration and dimensional metrology, concepts of units of measurement (UOM), ISO/IEC 17025 quality system requirements, and calibration procedures. Participants engaged in hands-on demonstrations involving a wide range of instruments such as vernier calipers, micrometers, bevel protractors, thread pitch gauges,

slip gauges, profile projectors, height gauges, laser measurement tools, and Coordinate Measuring Machines (CMMs). A visit to CMTI labs further enhanced the learning experience. The programme provided participants with valuable insights into standard calibration practices and quality assurance techniques, equipping them with practical skills relevant to precision engineering and industrial metrology.

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