2022-23 Odd semester

Volume 2 issue 17

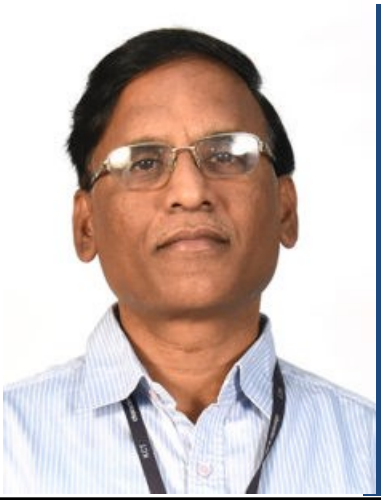
The Arrow

Department of Aeronautical Engineering Newsletter

KUMARAGURU
college of technology
character is life

Character is Life

- Arutselvar N.Mahalingam



HoD's Message:

It gives me great pride to share the latest updates from our Aeronautical Department through this newsletter. The recent months have been a testament to the dedication and excellence of our students and faculty, marked by achievements in research, sports, industry collaborations, and academic endeavors. These milestones highlight our relentless pursuit of innovation, learning, and professional growth in aerospace and defence technology.

I extend my heartfelt congratulations to everyone for their contributions and look forward to more accomplishments in the future.

Warm regards,
Dr. Sundararaj K
Head of Department, Aeronautical Engineering

In this issue

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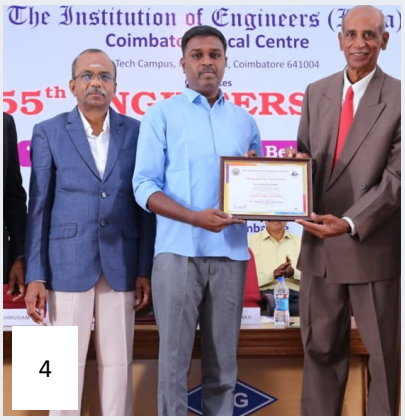

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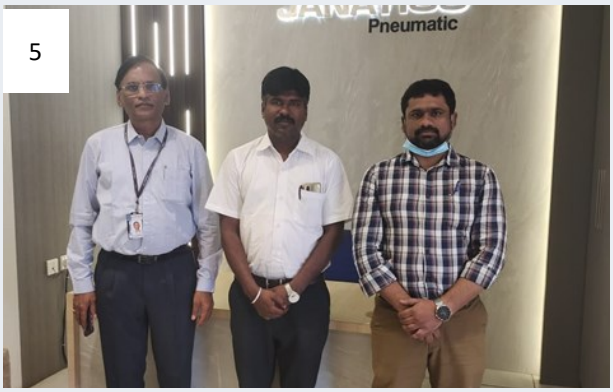

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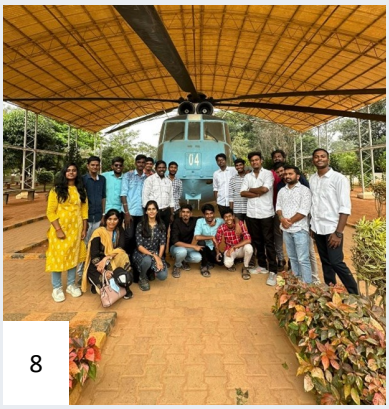

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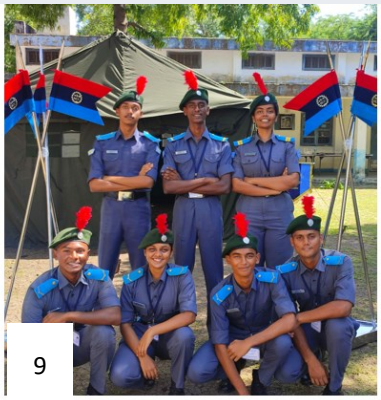

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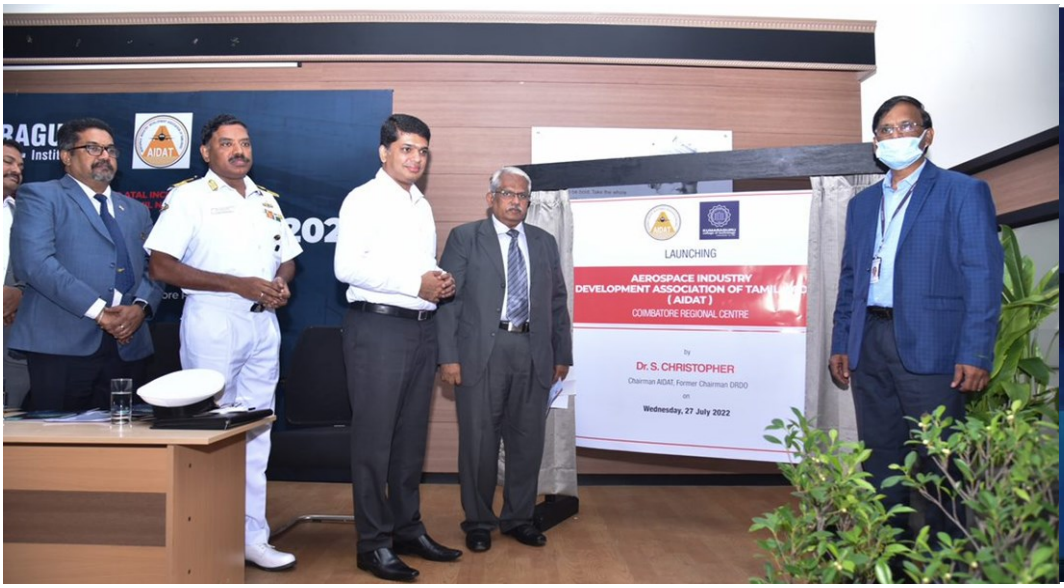
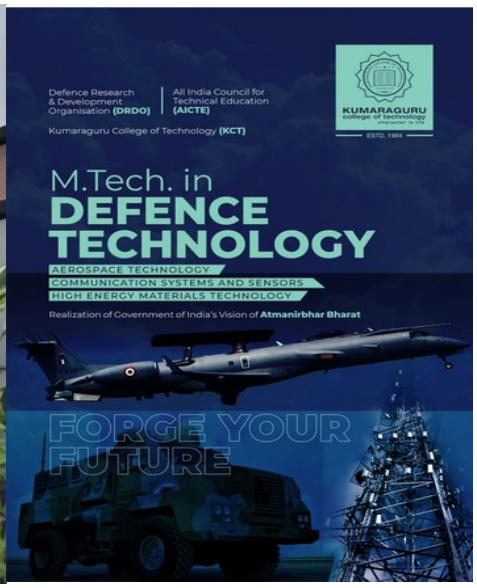


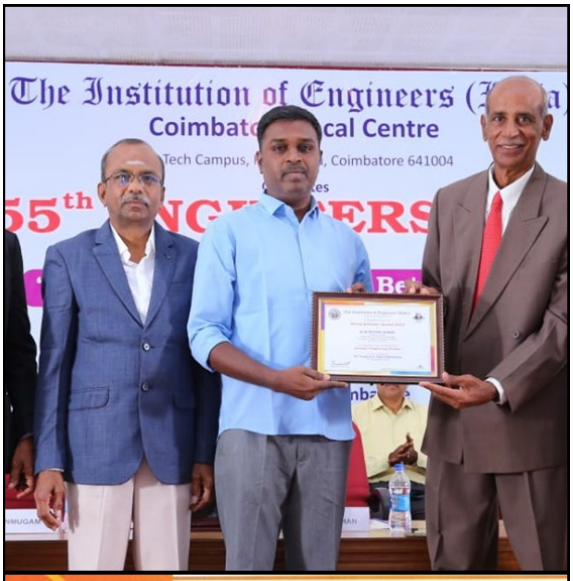


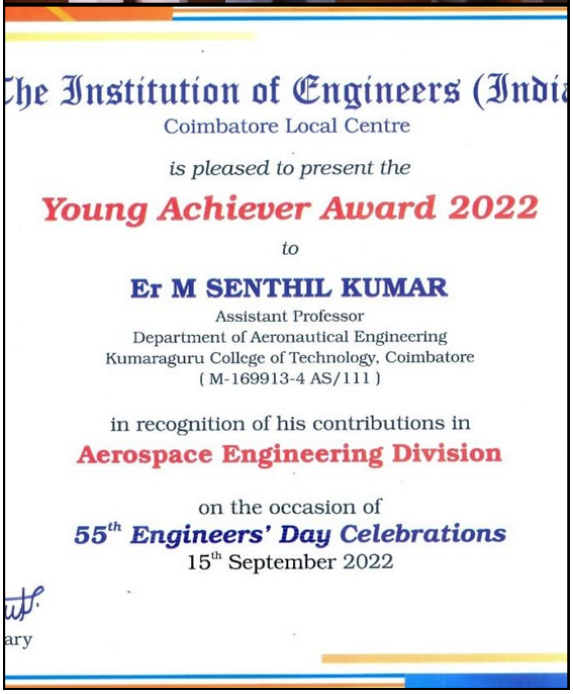
Inauguration of M.Tech in Defence Technology and AIDAT Regional Centre

The Aeronautical Department marked a significant milestone on **July 27, 2022**, by inaugurating its **M.Tech Defence Technology program** during the Coimbatore **Defence Conclave 2022** at Kumaraguru College of Technology (KCT). This program aims to advance education and research in defence-related technologies. The inauguration coincided with the establishment of the **AIDAT Coimbatore Regional Centre**, both initiatives launched during the conclave held on Dr. APJ Abdul Kalam Memorial Day.

Dr. S. Christopher, President of AIDAT, Professor at IIT Madras, and Former DRDO Chairman, delivered the keynote address, highlighting the importance of defence technology in shaping the nation's self-reliance. Distinguished speakers included Dr. S. Venugopal, Former Director ADE, and Mr. B. Krishnamoorthy, Additional Secretary, TIDCO, among other eminent figures from DRDO, HAL, Indian Navy, and industry leaders like L&T Defence.

The conclave, themed "**Defence Indigenisation Requirements, Opportunities & Industry Capabilities**," provided an exceptional platform for experts from academia, government, and industry to discuss the future of defence indigenisation in India. Mr. Shankar Vanavarayar, President of Kumaraguru Institutions, extended felicitations and emphasized KCT's commitment to fostering innovation and excellence in the defence sector. This event signifies a bold step towards nurturing talent and advancing India's defence capabilities, positioning KCT as a hub for cutting-edge research and development.



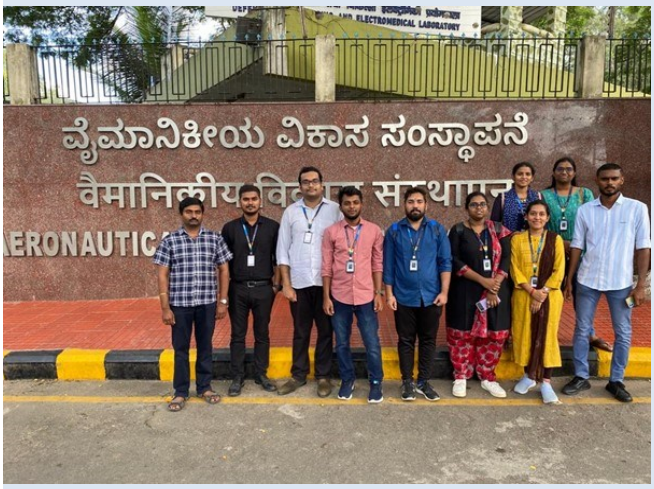


Dr. M. Senthil Kumar Honored with Young Achiever Award

The Aeronautical Department proudly congratulates **Dr. M. Senthil Kumar** on receiving the prestigious **Young Achiever Award** from the **Institution of Engineers (India), Coimbatore Local Center**, on the occasion of **Engineer's Day 2022**.

This award recognizes Dr. Senthil Kumar's exceptional contributions to engineering and academia, showcasing his commitment to innovation and excellence in the field. His achievement serves as an inspiration to colleagues and students alike, underscoring the department's ethos of fostering talent and dedication.

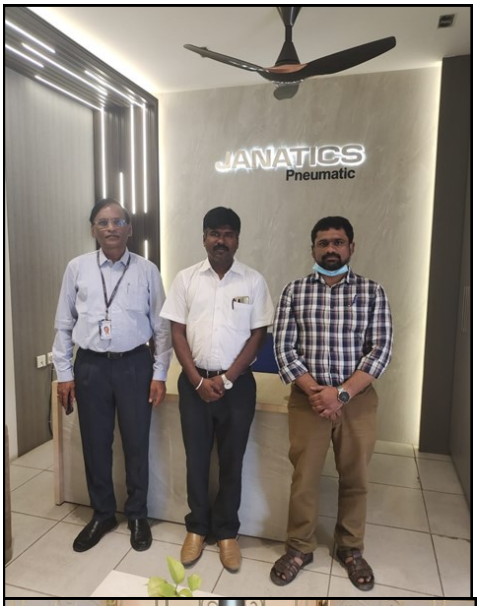
We extend our heartfelt congratulations to Dr. Senthil Kumar on this well-deserved honor!

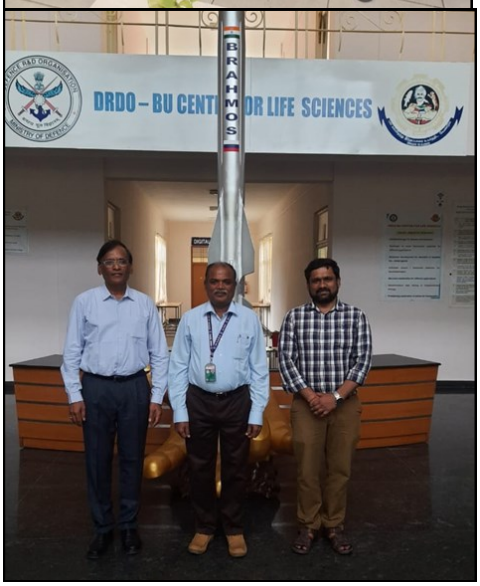


Student Engagement

Students from M.Tech defence technology went on to visit the IIT Madras Ocean Engineering department as part of their curriculum on Systems and warfare platform , accompanied by Dr. Sundararaj and Mr. Muthukumar S.

Students from M,Tech defence technology went on to visit the CVRDE, Chennai as part of their curriculum on Systems and warfare platform , accompanied by Dr.Sundararaj.





Strengthening Partnerships for M.Tech Defence Technology

To enhance collaborations, **Dr. Sundararaj K** and **Mr. Naveen Kumar K** from the Aeronautical Department met with key industry and research leaders:

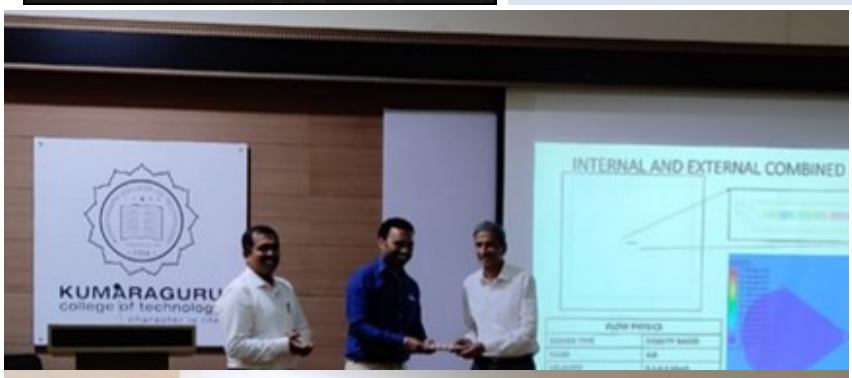
1. Industry Engagement:

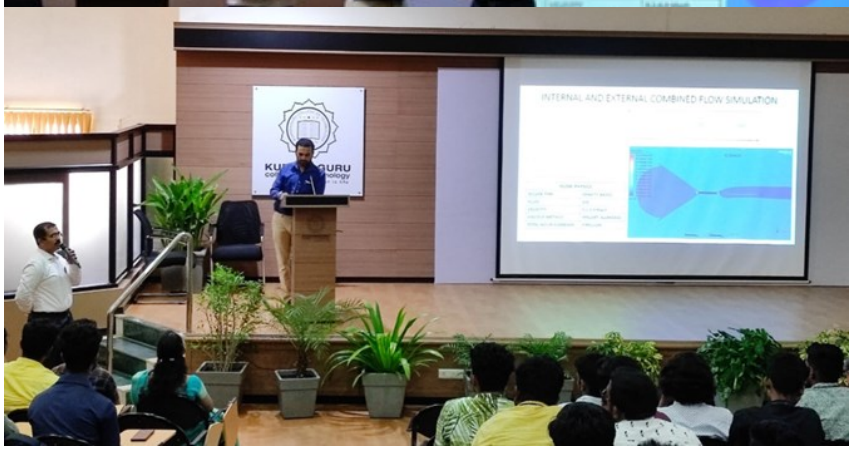
- Discussions with **Mr. S. Pradeep**, Head-HR at **Janatics India Pvt. Ltd.**, focused on fostering industry-institute activities for hands-on student training.

2. Research Collaboration:

- Interactions with **Dr. K. Kadirvelu**, Scientist 'F' at **DRDO-BU Center for Life Sciences**, explored joint research opportunities in unmanned aerial vehicles and defence technologies.

These initiatives aim to bridge academia and industry, enriching the M.Tech program and advancing research outcomes.

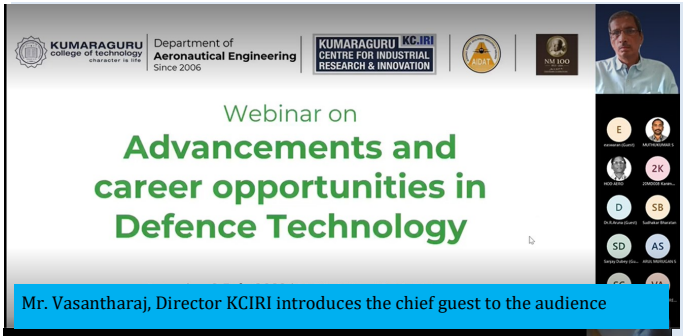




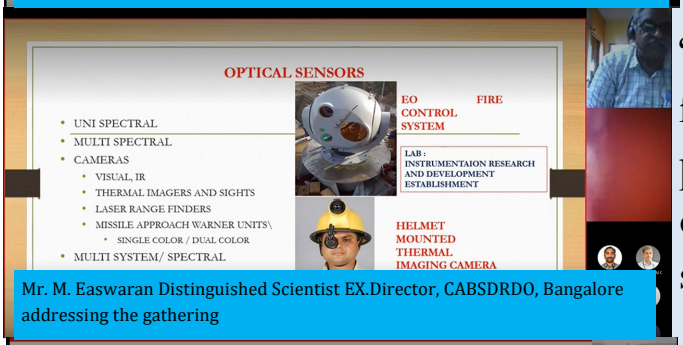
Guest Lecture on Turbulence Modeling

Students gathered at **Swami Vivekananda Hall** for a lecture by **Mr. Ramanjaneyulu Naidu**, Scientist at **CABS, DRDO Bangalore**, on **turbulence modeling** for AAAU. The session focused on the application of turbulence models in **CFD simulations**, particularly for internal flows, offering valuable insights into advanced aerodynamic analysis.

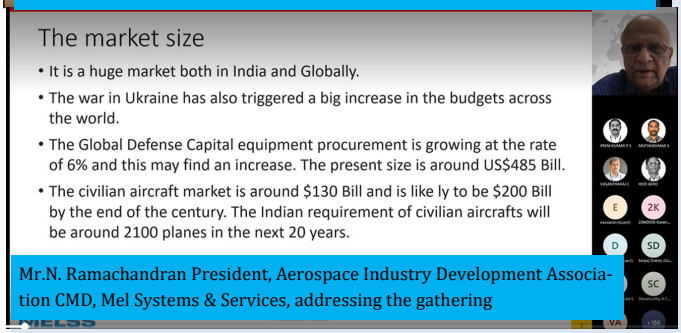
Seminar on Advancements and Career Opportunities in Defence Technology



Mr. Vasantharaj, Director KCIRI introduces the chief guest to the audience



Mr. M. Easwaran Distinguished Scientist EX.Director, CABSDRDO, Bangalore addressing the gathering



Mr.N. Ramachandran President, Aerospace Industry Development Association CMD, Mel Systems & Services, addressing the gathering

The Aeronautical Department, in collaboration with KCIRI, conducted a landmark seminar on "Advancements and Career Opportunities in Defence Technology."This event, held online, drew participation from 400 attendees across India, including students, faculty, and industry professionals on July 09 2022.

The seminar featured distinguished speakers from DRDO and the private defence sector who delivered insightful sessions on critical topics:

1. Aerospace Technology Developments in India's defence sector.

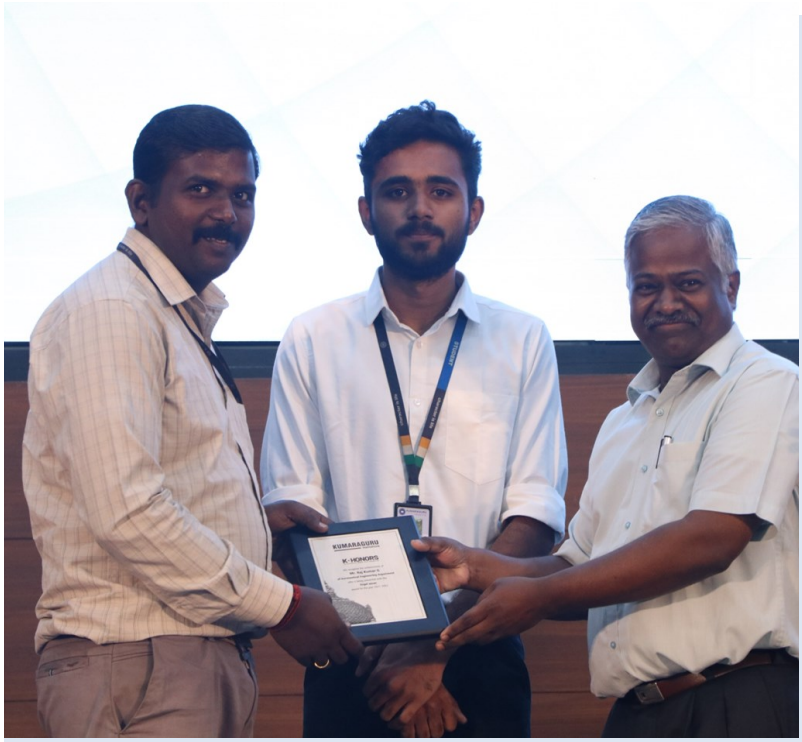
2. Communication Systems and Sensors Development for defence applications.

Mr. Vasantharaj, Director of KCIRI, opened the session by introducing the esteemed speakers, including:

Mr. M. Easwaran, Distinguished Scientist and former Director, CABS DRDO, Bengaluru, who addressed emerging defence technology trends.

Mr. N. Ramachandran, President of AIDAT and CMD of Mel Systems & Services, who shared valuable insights into the industry's role in fostering innovation.

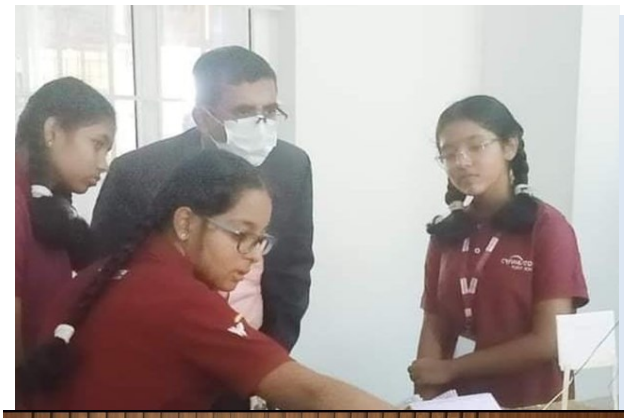
This event served as an exceptional platform to connect academia with defence technology advancements and career opportunities. Participants gained a deeper understanding of the evolving defence sector in India, motivating them to pursue impactful careers in this dynamic field.



Mr. Raj Kumar G Honored with Engal Aasan Award

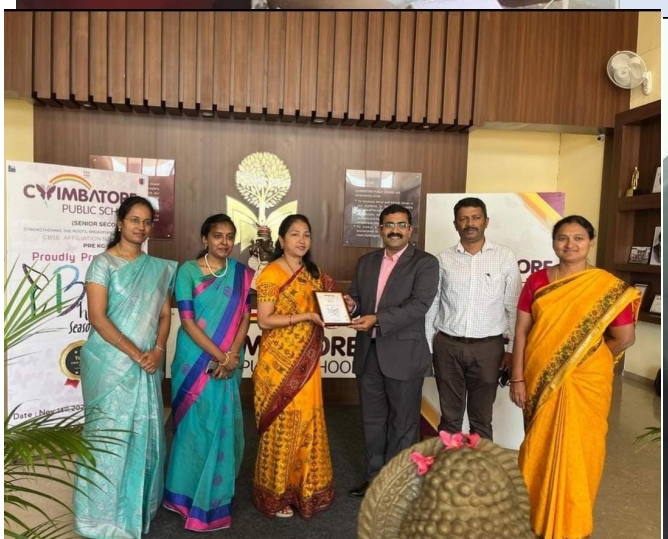
The Aeronautical Department proudly recognizes **Mr. Raj Kumar G** for receiving the **Engal Aasan Award** during the prestigious **K-Honors Ceremony** organized by Kumaraguru College of Technology. This award celebrates his excellence in teaching and unwavering dedication to inspiring and educating students

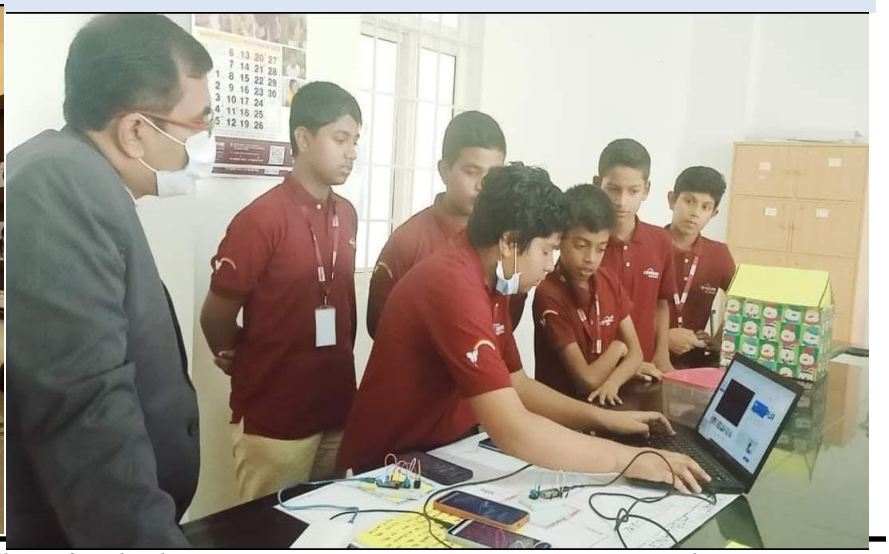
Mr. Raj Kumar's contributions to academic innovation and his commitment to shaping the next generation of engineers are exemplary. The department extends heartfelt congratulations on this well-deserved recognition, knowledge and guidance.

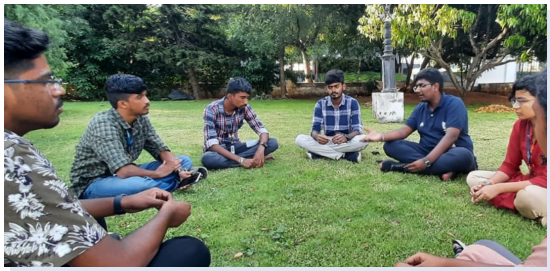


Dr. Premkumar P.S. as Science Exhibition Jury

Dr. Premkumar P.S. served as a jury member for the **School Science Exhibition** at **Coimbatore Public School** on **17th November 2022**, evaluating innovative projects and encouraging young minds in scientific exploration.



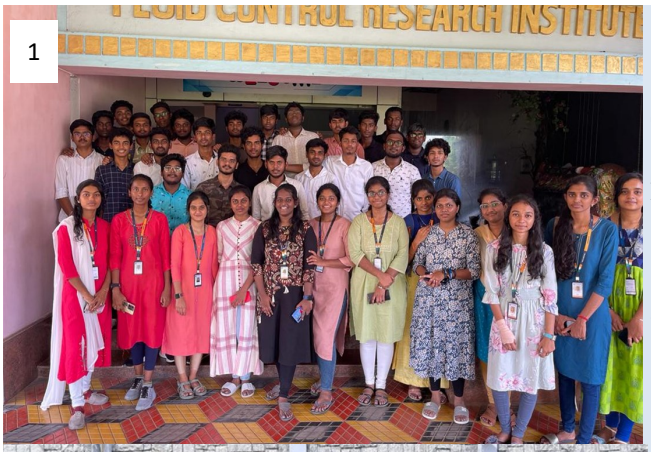


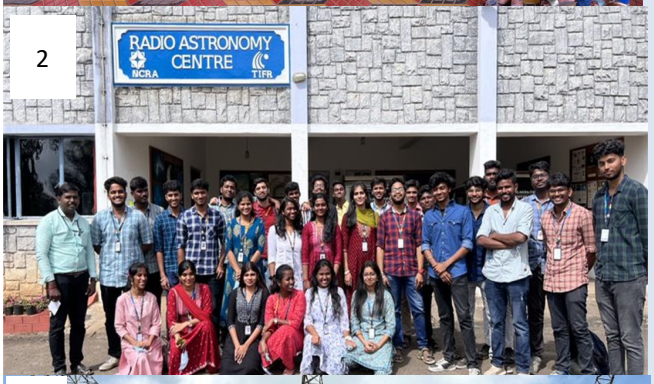


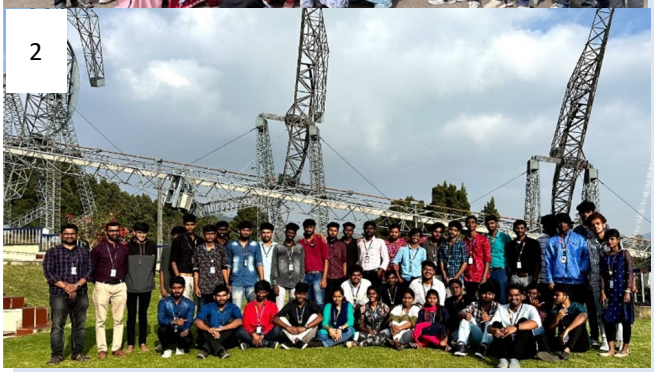
Technopendence Assemblage

Participants gathered at the **Auditorium Lawn** in a round-table setup to share views on events and outcomes prior to India's independence. Students engaged enthusiastically, and the session concluded with a final note by **Austin Joel**.

Students' Industrial Visit Highlights







The Aeronautical Department organized several insightful industrial visits for the students:

1. **Second-Year Students**: On **26th November**, 41 students visited the **Fluid Control Research Institute (FCRI)** in Palakkad, a central government calibration institute. They observed advanced methods for calibrating fluid and acoustic instruments, gaining exposure to state-of-the-art technologies.

2. **Third- and Final-Year Students**:Both batches visited the **Radio Astronomy Center (RAC)** in Ooty on **10th and 25th November**, respectively. Students explored cutting-edge research in radio astronomy, enhancing their understanding of advanced observational techniques.

3. **Final-Year Students**: The group also visited **Hindustan Aeronautics Limited (HAL)**, gaining valuable insights into India's premier aerospace manufacturing and research capabilities.

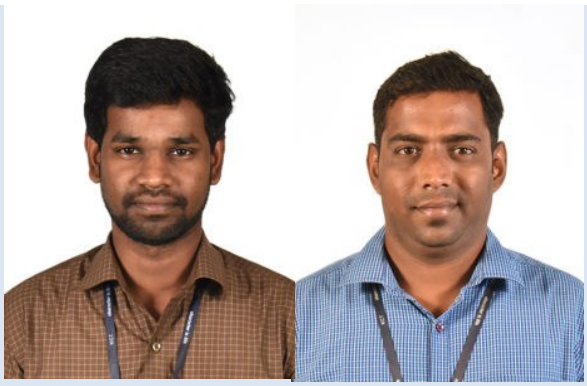
Achievement at AIVSC 2022

The Aeronautical Department proudly congratulates **Cadet Srivathshan M** from **5(TN) AIR SON (TECH) NCC** for being selected to attend the prestigious **All India Vayu Sainik Camp (AIVSC) 2022** held from **24th September to 5th October 2022**.

This remarkable achievement highlights Srivathshan's dedication and excellence in NCC training, demonstrating leadership and skill at a national level. The department applauds his hard work and wishes him continued success in future endeavors.

Achievement in Zonal Level Hockey Tournament

The Aeronautical Department proudly congratulates **Dinesh P (20BAE008)** for securing **First Place** in the **Zonal Level Hockey Tournament**. His dedication and exceptional performance have brought honor to the department and inspired fellow students to strive for excellence.



Patent Filing Achievements by Faculty

The Aeronautical Department is proud to announce two significant patent filings:

1. Dr. Darshan Kumar J and **Mr. Vijayanandh R** have filed a patent on the **"Design and Development of Nano Drone,"** reflecting their innovation in compact aerial systems.

2. Mr. Vijayanandh R has also independently filed a patent on the **"Design and Computational Development of Ducted Frame-Based Hybrid UAV,"** showcasing advanced research in unmanned aerial vehicle technology.

List of Faculty activities during the 2022-23 Odd Semester

Book Chapter Published

1. Mr. Vijayanandh R published a book chapter titled "Structural Optimizations of Different Load-Carrying Members Based on Low Structural Performance" in the book Advancements in the Processing, Characterization, and Application of Lightweight Materials published by IGI global.
2. Mr. Vijayanandh R published a book chapter titled PVEH based Electrical Energy Creation in Marine Propeller through Computational Hydrodynamic and Vibrational Simulations in the book Transition in Energy Sector: Scope, Challenges, and Future Opportunities published by Central West Publishing, Australia ".
3. Mr. Vijayanandh R published a book chapter titled "Experimental Investigation on Process Parameter Optimization to Enhance Tensile Strength in FDM—3D Printing Process with PLA Material" in the book Recent Advances in Intelligent Manufacturing & Lecture Notes in Mechanical Engineering published by Springer, Singapore
4. Dr. M. Senthil Kumar and Mr. VIJAYANANDH R published a book chapter titled "Multi Perspective Aerodynamic Studies on the Intercity Bus with and Without Drag Reductions Techniques by Using Engineering Approaches " in the book Lecture Notes in Mechanical Engineering. Springer, Singapore published by Springer, Singapore

FDP Attended

1. Dr M Senthil Kumar attended International Sustainable Energy Development: Recent Advances and Future Prospects at KCT from 08.08. 2022 to 14.08.2022.
2. Mr.R. Arun kumar attended "Accreditation and Outcome Based Learning " from 21/8/2022 to 30/10/2022 in Virtual mode.
3. Mr. R. Arun kumar attended "Facilitating Institutional Social Responsibility and Community Engagement in Higher Educational institutions" from 26-09-2022 to 01 -10-2022 in Mahatma Gandhi National Council of Rural Education and Sarada Krishna Homoeopathic Medical College
4. Dr M Senthil Kumar attended AICTE – Teaching and Learning Academy (ATAL) FDP on "Energy Engineering" at Periyar University, Salem from 07.11.2022 to 18.11.2022.

List of Faculty activities during the 2022-23 Odd Semester

Conference Attended

1. Dr M Senthil Kumar presented a paper on Aerodynamic and Structural design of a Horizontal Axis Wind Turbine in the National Level Conference & Poster Presentation on Emerging Trends in Defence, agriculture & Artificial Intelligence sector Organised by PSG Drone Research Lab in Collaboration with Jet Aerospace Aviation Centre, Kerala.

Short Term Course

1. Dr. Darshan kumar completed a short term course on "National Symposium on UAV Electronics" from 26-Dec-22 to 01-Jan-22 at IIT Madras , Chennai.
2. Mr. Vijayanandh R completed a short term course on "National Symposium on UAV Electronics" from 26-Dec-22 to 01-Jan-22 at IIT Madras , Chennai.

Papers reviewed

1. Mr. Vijayanandh R has reviewed a paper titled " Experimental and numerical study of novel Coanda based unmanned aerial vehicle" in Journal of Engineering and Applied Science
2. Mr. Vijayanandh R has reviewed a paper titled "Deformation monitoring of propeller underwater operation based on fiber optic grating sensing network" in Journal of Ocean Engineering
3. Mr. Vijayanandh R has reviewed a paper titled "Mobility Management of Unmanned Aerial Vehicles (UAVs) in Ultra-Dense Heterogeneous networks" in Journal of Sensors
4. Mr. M.Senthil kumar has reviewed a paper titled " Conversion of Plastic Waste to Fuel" in Materials Today: Proceedings.
5. Mr. Vijayanandh R reviewed "UCAV Air Combat Maneuver Decision Based on PPO Algorithm with Situation Reward Shaping" in Electronics International Journal, SCI
6. Mr. Vijayanandh R reviewed "Shape sensing for an UAV composite half-wing: Numerical comparison between Modal Method and Ko's Displacement Theory" in Aerospace International Journal, SCI.
7. Mr. Vijayanandh R reviewed "Numerical analysis of machining induced stress distribution for 7075 aluminium syntactic foams" in Materials International Journal, SCI.

List of Faculty activities during the 2022-23 Odd Semester

8. Dr Premkumar PS reviewed "Effect of Localized Pressure Depression and Rain on Aerodynamic Characteristics of MALE UAV" in Defence science Journal
9. Dr M Senthil Kumar reviewed "Vibration Damper Design and Additive Manufacturing for Unmanned Aerial Vehicles Simulation modelling Practice and Theory International Scopus / WoS
10. Mr. Rajkumar G reviewed "Vibration Damper Design and Additive Manufacturing for Unmanned Aerial Vehicles" in Simulation Modelling Practice and Theory International Journal, SCI
11. Dr Senthilkumar M reviewed "Flexible heat integration system in first-/second-generation ethanol production via screening pinch-based method and multiperiod model" in Energy Journal International, SCI

Papers Published

1. Mr. Vijayanandh R published paper titled "Raja, V.; Gnanasekaran, R.K.; Razak Kaladgi, A.; Rajendran, P.; Khan, S.A.; Asif, M. Multi-Disciplinary Computational Investigations on Asymmetrical Failure Factors of Disc Brakes for Various CFRP Materials: A Validated Approach. Symmetry 2022.
2. Mr. Vijayanandh R published paper titled Ehsan F Abbas, Tahseen A Tahseen, N A Madlol, Hulya S Sulaiman, Hussein A Z AL-bonsrulah, Vijayanandh Raja, Mohammed Al-Bahrani, High performance evaluation of a PV/T hybrid system connected with a thermal store unit holding paraffin wax, International Journal of Low-Carbon Technologies, 2022.
3. Mr.Rajkumar G published titled "Material and cross sectional shape optimizations on polymer matrix composites through computational structural analysis under crippling load" in AIP Conference Proceedings 2446, 150005 (2022).

List of Faculty activities during the 2022-23 Odd Semester

Papers Published

4. Mr. Vijayanandh R published paper titled "Senthil Kumar Madasamy, Vijayanandh Raja, Hussein A Z AL-bonsrulah, Mohammed Al-Bahrani, Design, development, and multi-disciplinary investigations of aerodynamic, structural, energy, and exergy factors on 1 kW horizontal Axis wind turbine, International Journal of Low-Carbon Technologies, 2022;, ctac091, https://doi.org/10.1093/ijlct/ctac091.

5. Mr. Vijayanandh R published paper titled Raja Dhas JE, Savio Lewise KA, Kumar KN, Raja V, AL-bonsrulah HAZ, Ahmad H, Yao S-W and Al-Bahrani M (2022) Effect of coconut shell nanopowder reinforcement in the development of palm fiber composites. Front. Mater. 9:986011. doi: 10.3389/fmats.2022.986011.

6. Mr. Vijayanandh R published paper titled Raja, V.; Gnanasekaran, R.K.; Rajendran, P.; Mohd Ali, A.; Rasheed, R.; AL-bonsrulah, H.A.Z.; Al-Bahrani, M. Asymmetrical Damage Aspects Based Investigations on the Disc Brake of Long-Range UAVs through Verified Computational Coupled Approaches. Symmetry 2022, 14, 2035. https://doi.org/10.3390/sym14102035

7. Mr. Vijayanandh R published paper titled Ehsan F Abbas, Tahseen A Tahseen, N A Madlol, Hulya S Sulaiman, Hussein A Z AL-bonsrulah, Vijayanandh Raja, Mohammed Al-Bahrani, High performance evaluation of a PV/T hybrid system connected with a thermal store unit holding paraffin wax, International Journal of Low-Carbon Technologies, 2022;, ctac087, https://doi.org/10.1093/ijlct/ctac087.

8. Mr.Rajkumar G published titled "Design and fabrication of composite shaft using stir casting technique (MMC)" in AIP Conference Proceedings 2446, 040014 (2022); https://doi.org/10.1063/5.0109227

9. Mr.Rajkumar G published titled "Static analysis of conventional aircraft fuselage with different materials" in AIP Conference Proceedings 2446, 180044 (2022); https://doi.org/10.1063/5.0109231

List of Faculty activities during the 2022-23 Odd Semester

Papers Published

10. MrVijayanandh R published Wang, Y.; Kumar, L.; Raja, V.; AL-bonsrulah, H.A.Z.; Kulandaiyappan, N.K.; Amirtharaj Tharmendra, A.; Marimuthu, N.; Al-Bahrani, M. Design and Innovative Integrated Engineering Approaches Based Investigation of Hybrid Renewable Energized Drone for Long Endurance Applications. Sustainability 2022, 14, 16173.

11. Mr. Arul Prakash R published "R. Vijayanandh, R.A. Prakash, R. Manivel, P. Kiran, R. Sudharsan, G.R. Kumar and R. Raffik. 2022. Design and Parametric Study of Counter-Rotating Propeller of Unmanned Aerial Vehicles for High-Payload Applications based on CFD-MRF Approach", Int. J. Vehicle Structures & Systems, 14(7), 840-848. doi:10.4273/ijvss.14.7.03.

12. Dr.Premkumar P S published paper at the AIP conference proceedings titled ""Numerical study of leading-edge defect on the aerodynamic characteristics"" in AIP Conference Proceedings 2446, 150005 (2022).

13. Dr.Premkumar P S published paper at the AIP conference proceedings titled "Numerical analysis on the effect of rotating cylinder over the symmetrical airfoil" in AIP Conference Proceedings 2446, 150005 (2022).

14. Dr.Premkumar P S published paper at the AIP conference proceedings titled "Computational study of slotted winglets on aircraft wings" in AIP Conference Proceedings 2446, 150005 (2022).

15. Mr. Muthukumar S published a paper titled "Design and Analysis of 2-kW Straight Bladed Vertical Axis Wind Turbine" at the AIP conference.

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COIMBATORE – 641 049

Department of Aeronautical Engineering

INSTITUTE VISION

The vision of the college is to become a technical university of International Standards through continuous improvement.

INSTITUTE MISSION

Kumaraguru College of Technology (KCT) is committed to providing quality Education and Training in Engineering and Technology to prepare students for life and work equipping them to contribute to the technological, economic and social development of India. The College pursues excellence in providing training to develop a sense of professional responsibility, social and cultural awareness and set students on the path to leadership.

DEPARTMENT VISION

To attain excellence and global reputation in Aeronautical Engineering Education and Research.

DEPARTMENT MISSION

M1: The department is committed to provide quality education in Aeronautical Engineering to students to build their career and do quality research and thus contribute to the field of Aviation and Aerospace.

M2: The department aims to prepare students for their higher studies and research to contribute to the advanced technological needs of Aeronautical engineering.

M3: To encourage faculty to update their knowledge and teaching-learning process through continuous learning.

M4: To undertake inter-disciplinary research to contribute and support the industry.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

The Program Educational Objectives (PEOs) of Aeronautical Engineering Undergraduate Program are to prepare the students:

I. To pursue a successful profession in leading organizations.

II. To pursue postgraduate degrees and conduct research at leading technological universities to contribute to the advancement in the field of Aviation and Aerospace industries.

III. Continue their professional development by utilizing educational and career building opportunities through their employer, educational institutions, or professional bodies.

PROGRAM OUTCOMES (POS)

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

and systems.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commitment to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life -long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOS):

PSO1: Apply fundamental principles of Aerodynamics, Structures, Propulsion, Materials, and Avionics to provide solutions to aerospace and non-aerospace industrial problems.

PSO2: Use the software packages in the design, manufacturing, testing and maintenance of aeronautical and aerospace based components