

# MOBILITY ENGINEERING

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**ELECTRIC**  
Vehicle  
*News and Applications*

**TECHNOLOGY**  
Trends



# DRONE

NEWS AND APPLICATIONS

**SAEINDIA**  
Society of Automotive Engineers INDIA

# COVER

## Story

### CENTRE FOR AUTONOMOUS SYSTEMS SETS THE TREND FOR UAVS

**Aeromodelling activities and Remotely Piloted Aircraft designing activities were started in CAS - Centre for Autonomous Systems, HITS during early 2000.**



HITS (Hindustan Institute of Technology and Science) Aero Club started its functioning in student training and RPV designing from 2004. Building static aircraft models and balsa chuck glider models were the activities of the club during the early periods. The HITS Aero Club stood as the only collegiate club for model aircraft learning at its beginning stage. “The role of HITS Aero Club in aeronautical department symposium attracted a huge technical gathering during the decade of club inaugural. Later the club activity attracted students from other institutes including IIT, CEG and MIT. Model Aeronautics grew across the state of Tamil Nadu through the knowledge sharing from HITS Aero Club. HITS Aero Club inspired Indian engineering institutions which fuelled the activities towards model aeronautics and later evolved into UAV,” says Prof. C. S. Karunakaran.

From the beginning, till now it was led by various skilled academicians. Instructor Mr. Easwaran, Mr. David Kitson and Mr. Arun Jaya Prakash contributed during the early times. Later the torch was transferred to Prof. C.S. Karunakaran. Also, effective contributions by Prof. Dalbir Singh, Prof. G. Dinesh Kumar, passionate student teams and strong management support stood as a catalyst to transform the hobby club into the research centre, later.

#### Centre for Autonomous Systems

The Centre for Autonomous Systems is the gateway to a unique environment created in India to both facilitate and accelerate the growth of the Unmanned Air Systems (UAS) industry. CAS is the first UAS research, training and development range of its kind among Indian educational institutes. With safety, management and operational infrastructure delivered by School of Aeronautical Sciences, Hindustan University, access is enabled to:

- Unmanned air systems R & D
- Integrated unmanned air systems operating environments
- Expert technical and operational support
- Outstanding infrastructure and test facilities
- Development and demonstration flight trials
- Training



In addition to the capabilities above, acting as the shop window of Indian UAS development, this exciting new environment facilitates the commercialization of research. School of Aeronautical Sciences has bagged several titles and championships in prestigious international UAV competitions like Aero Design (SAE International) and International Aerial Robotics Competition (Association of Unmanned Vehicle System International). Every year, a goal of more than 50 new successful UAV designs through student projects and competitions have transformed UAV activity into its next dimension of Centre for Autonomous Systems.

“It gives me great pleasure to see that Chennai is turning into the drone hub of India. And being part of the Chennai’s drone community and as Faculty coordinator of Aero Club, Centre for Autonomous Systems of Hindustan Institute of Technology and Science I am witnessing the great opportunities lined up for Chennai. Any sector starts with a passionate hobby group which transforms to a research group leading to innovation, product development and societal service. Later it transforms into a humongous professional sector comprising the areas of manufacturing, production, sales, operation, service and maintenance. Chennai’s aeromodelling hobby community which was existing for the past 2 decades has evolved as a strong research group and is now getting ready to provide the much-needed drone consumer market products. The Centre for Autonomous Systems of Hindustan Institute of Technology and Science, has grown

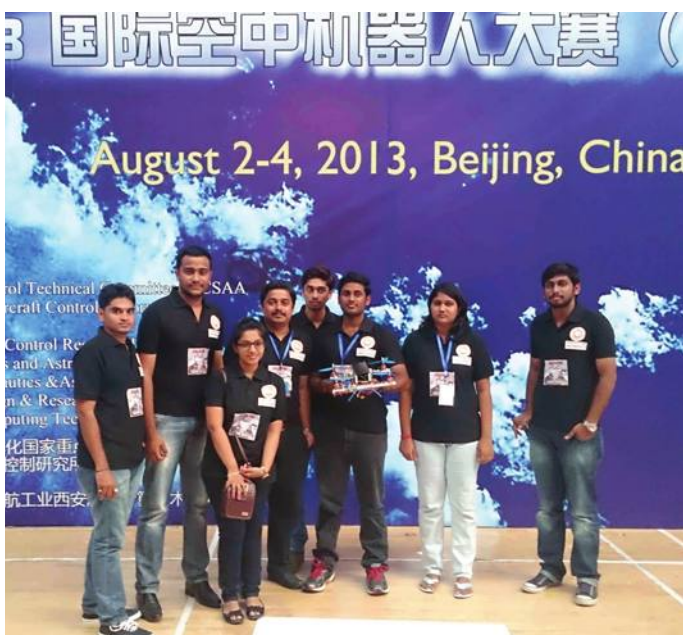


to a capability of component manufacturing for drones,” says Karunakaran.

### The Aero Club

The Aero Club of HITS became a place of innovation and fixed-wing RPV designing for most of the South Indian Aeronautical Engineering students. Until the periods of late 2010 and 2011 HITS Aero Club supported fixed-wing RPV works only but after 2012 it started to transform as a research centre and product development lab. Activities related to Multicopters, autonomous drones, ornithopters and MAVs started to roll out along with fixed-wing FPVs.

In 2013 HITS represented its debut participation at SAE International Aero Design West at Los Angeles, CA, USA. Prof. Dalbir Singh and Prof.C.S.Karunakaran guided the team SUAVE which performed extraordinarily. This became the seed to launch SAEINDIA Aero Design Challenge later in 2016. In the same year of 2013, Team Recon guided by Prof. G. Dinesh Kumar and Prof. C. S. Karunakaran represented HITS Aero Club for the first time in International Aerial Robotics Competition conducted annually by Association of Unmanned Vehicle System International at Tsinghua University, Beijing, China. The team won “International Shepherd Award” in the debut autonomous drone contest. With respect to the continuous representations nationally and internationally the active team of HITS Aero Club become a more familiar and visible talent group across South India. This earned the drone student group guided by Prof. C. S. Karunakaran an invite by Honourable Late Dr A. P. J. Abdul Kalam, Former President of India to Raj Bhawan during the year 2013. “This motivation propelled the activities at HITS Aero Club which resulted in an exponential increase in activities. The management of HITS recognized and sponsored both students and faculties to represent in various national and international contests. The teams started to represent India and



# COVER Story

## DRISHYAM 4.0

Drishyam 4.0 is the project conceived by HITS and Orient Flights launched to support Police Department for crowd monitoring and control during COVID-19 headed by Prof.C.S.Karunakaran, Assistant Professor, School of Aeronautical Sciences, HITS. 12 Professional Aerial Photographers and drone pilots based in Chennai City were inducted for the project. DJI Inspire, DJ Mavic Pro 2, DJI Mavic mini and DJI Phantom 4 are the drones used for this project. The project was started on 5<sup>th</sup> of April 2020. The drone pilots worked in hands with Chennai City Police during the lockdown to monitor the streets to avoid crowd gathering. Crowd monitoring



by drones were very helpful for Chennai City Police as they could monitor a wide area by not roaming into the streets. Sealed places are susceptible to be infectious hence personal inspection in those areas are harmful to authorities, our support helped in easing such inspections. People started to realize that they are being monitored when a drone is spotted which resulted in reduced crowd gathering. In a country like India Project Drishyam 4.0 can play a big role in crowd monitoring by inducting more drone pilots across India. Drishyam 4.0 team is ever ready to support India in the crowd management during this COVID-19 outbreak.

won laurels in various contests conducted by SAE International, AUVSI, AIAA, Airbus, NASA, SAEINDIA, IEEE, AeSI and IAAA,” says Prof. Karunakaran.

The passion to design, develop and compete in drone technology slowly transformed in to component and product development. The research in product development and component development transformed the Aero Club into Centre for Autonomous Systems in 2015. Dr. A.S.Kiran Kumar, Former Chairman ISRO inaugurated the Centre for Autonomous Systems and witnessed the transformation of the activities initiated at HITS School of Aeronautical Sciences by its Aero Club. “CAS of HITS became the centre for entrepreneur development activities. Drone product development and training programmes were introduced and hundreds of students started to work and get trained every year. The centre has created more than 20 successful startups and the research activities carried out resulted in many patents and publications. Promising start-ups Vaayusastra PVT Ltd, Raven Aerial Technologies PVT Ltd, Maven Technologies, Jhatayu, Aero2Astro etc., had their beginnings from the CAS. Prototypes and products

such as Asia’s First Flying Bike, Indian Air Force Swarm Drone, Drone Propellers, 3D printed frames, Draupathi Multicopter, Control Boards by CAS increased its need and assured its role in drone manufacturing,” informs Prof. Karunakaran.

“The readiness and technological expertise led CAS HITS to support Tamil Nadu City Police in the Pandemic. Orient Flights India’s leading Pilot Training Institute and CAS HITS initiated project Drishyam 4.0. Drishyam 4.0 used the drones and research groups of CAS HITS for the aerial monitoring and crowd management during the Pandemic Lockdown. As soon as the lockdown was announced the CAS team started working along with the Tamil Nadu Police in controlling and monitoring the crowd movement. The products of CAS HITS were very supportive in societal service needs and during the disasters time. The CAS HITS is extending its operations in drone component manufacturing, aerial surveying and product development. Very soon drone mass production facility will be available at CAS HITS to meet the need of India’s drone consumer market,” concludes Karunakaran.

**Nikhil Raghavan**



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