

MARCH 2020

# Kavinaam of Tayaran

70TH AGM OF THE  
AERONAUTICAL SOCIETY OF  
INDIA

BEST AERONAUTICAL  
DEPARTMENT AWARD FOR KCG-  
AERO

NATIONAL CONFERENCE ON RECENT  
DEVELOPMENTS IN AEROSPACE &  
DEFENCE TECHNOLOGY



ANNUAL MAGAZINE 2020

"KavinaaM of Tayaran" is combination of language gives the meaning "Great Thinkers of Aviation". KavinaaM is the word taken from the Sanskrit language giving the definition

"Great Thinkers". Tayaran is the word which is been found from Arabic language means "Aviation".



## Vision

The Department of Aeronautical Engineering envisions becoming a center of excellence, equipping the students with value and skill based education, pursuing globally relevant research and producing professionals committed to nation building.

## Mission

- Impart quality technical education and unique interdisciplinary experiences
- Develop the analytical, computational and design capabilities to provide sustainable solutions
- Expose the students to the current trends and opportunities in the global Aerospace industry
- Inculcate professional responsibility based on an innate ethical value system

# View Point

The 70th Annual General Meeting of The Aeronautical Society of India along with the National Conference on recent developments in Aerospace and Defence Technology is being held on 21st - 22nd February, 2020 with the theme "Regional Transport Aircraft - Opportunities and Challenges" at Hindustan Institute of Technology and Science (HITS), Chennai. Thiru. BANWARILAL PUROHIT, Honorable Governor of Tamil Nadu inaugurated the session and addressed the gathering. This two-day conference will act as a knowledge-sharing forum for business professionals, scientists, academicians, industrialists, researchers, and students in the field of the aerospace sector.

Publishers: **Department of Aeronautical Engineering & CAE**

Patrons: **Dr. Elizabeth Verghese**

(Chairperson, HGI)

**Dr. Anand Jacob Verghese**

(Director and CEO, HGI)

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(Director- KCG)

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## **70TH AGM OF THE AERONAUTICAL SOCIETY OF INDIA & NATIONAL CONFERENCE ON RECENT DEVELOPMENTS IN AEROSPACE & DEFENCE TECHNOLOGY**

The inauguration of the 70th Annual General Meeting of the Aeronautical Society and the National Conference on Recent Developments in Aerospace and Defence Technology on the theme “Regional Transport Aircraft - Opportunities and Challenges” was held at Hindustan Institute of Technology and Science (HITS), Chennai on 21st February 2020. The chief guest for the event was Thiru. BANWARILAL PUROHIT, Honorable Governor of Tamil Nadu. The two-day conference aims and acts as a forum for knowledge sharing between business professionals, scientists, academicians, industrialists, researchers and students in the field of aerospace sector. In his address, the Honourable Governor said that he is happy to be in HITS for the inauguration of the 70th Annual General Meeting of The Aeronautical Society of India. He made a special mention of the Founder Chairman (Late) Dr. K.C.G. Verghese who inspired and motivated many students in the field of Aviation. He said that HITS has grown in leaps and bounds and is producing many talented engineers. He greatly appreciated the institution for its notable contribution towards the development of the nation.



**Dr. K. Sivan, Chairman, ISRO, was presented the Outstanding Leader in Aerospace and Defence award. He received the award from the Honourable Governor of Tamil Nadu. In his acceptance speech, Dr. Sivan recollected his struggle-filled childhood in Kanyakumari and the education that he underwent in government institutions. He also mentioned about the future missions of ISRO and said that Chandrayan 3 will be launched in a year's time and as a first time accomplishment in the history of space research, a humanoid will travel in Chandrayan 3. Dr. Sivan also said that four astronauts have been selected and are undergoing training in Russia for future missions. He also informed about the new launch pad that is to be established in Tamil Nadu.**

**During the event, the Best Aeronautical Engineering Department Award was presented to KCG Aeronautical.**

**Dr. V.K. Saraswat, Member, NITI Aayog was presented the Life-time Achievement award. He received the award from the Honourable Governor of Tamil Nadu. In his acceptance speech, Dr. Saraswat dedicated his award to his team members for last 40 years which helped him in his journey of developing certain technologies for the nation. He mentioned that our country has done tremendous work as far as aerospace & defence technologies are concerned. But the technology is not static and we have many more miles to achieve. When the technologies are changing universities like Hindustan Institute of Technology & Science (HITS) with their programs like aeronautics & aerospace have to make a major change. He also mentioned that he was lucky to receive a honorary doctorate from HITS.**

**Dr. Anand Jacob Verghese, Vice President of AeSI, Organising Committee Chairman and Director & CEO of Hindustan Group of Institutions delivered the welcome address. He welcomed all the distinguished guests and delegates from ISRO, DRDO, HAL, NAL, DGCA, Indian Air Force, Indian Navy, Airport Authority of India, Airlines and Aviation Companies. In his address, Dr. Anand Jacob Verghese said that this is the first time the AeSI AGM is held in a large scale in Chennai and is attended by 500 delegates. He proudly highlighted the fact that the Chennai Branch of AeSI has been functioning for six decades and is one of the largest professional societies that houses more than 700 members.**

The inaugural function was followed by sessions on Aerodynamics and Flight Mechanics, Air Transportation and Airworthiness, Aircraft Structures, Propulsion & system Avionics. The Technical Sessions dealt with the Trends of Regional Transport Operations, Perspective on Advances in Air Transportation, Trends in Airline Operations, Global Market Trends - MRO/Pilot Training, Challenges in Airline Management. Also special lecture sessions like: Dr. KCG Verghese Memorial Lecture, A Lecture on Aviation Law and Dr. Kalpana Chawla Memorial Lecture.



# ALUMNI CORNER



**SUDHAKAR SHANMUGAM**

**Propulsion R & D Officer, IITM**

**2010-2014**

**The place that helped me recognise my true potential and transformed me into a successful Aerospace Engineer is the Department of Aeronautical Engineering. The guidance and support that I got from our faculty and staff was tremendous. With the kind of knowledge, skills, exposure and experiences that were made available to us, was very fortunate to get a job in my field of education with ISRO on Rocket Propulsion“**

# PROUD MOMENTS



Winning moments... KCG Aero Staff team- Annual Sports day



"Look up, there are no limits." KCG AERO Team developed Medium altitude Range UAV .

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# PROUD MOMENTS



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KCG Aeronautical Department Mini project Challenge 20. A pic of Innovation Excellence

# BEST PROJECTS

## FABRICATION OF RADAR ABSORBENT MATERIAL WITH NANO FILLERS FOR FIGHTER AIR CRAFTS

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The world always gets fascinated of disguising their presence in front of others. This is also applicable to all the fighter air crafts in the world. Therefore, to shield the presence of the aircraft in the war field from the enemy's radar, the concept of stealth raised in the world in the early 1950s. Multiple researches have been done across the globe by many countries for many decades to achieve stealth effect in the fighter aircraft. In this research work, we are completely focusing on the fabrication of the glass fibre reinforced plastic (GFRP) (radar absorbent material) with Nano fillers that is capable of absorbing the electromagnetic waves (micro waves) that are emitted from the radar. The working range of the frequency is 12 to 18 GHz which lies in the Ku band (microwaves). The return loss of the material is expected to be in between 8 to 9 dB which is almost 80 to 90% of the emitted radiation. The fillers used in the project are Nickel Oxide and Activated charcoal with 20% of HCl. The most important property of nickel oxide is magnetic susceptibility of -1 which is important for the absorption of the electromagnetic radiation. The activated charcoal has the property of enhancing the absorption capacity of the nickel oxide. The fillers have been chemically synthesized in Nano size of about 40 to 50 nanometres which has increased surface area of absorption in the composite. This directly reflects on the albedo rating of the material which is said to be very less for the radar absorbing material (RAM). Albedo rating = the amount of energy reflected by the material / the amount of energy absorbed by the material. In this project, we are aiming to maintain the albedo rating of the RAM in between 0.1 to 0.3

# BEST PROJECTS

## EXPERIMENTAL INVESTIGATION OF LIFT COEFFICIENT OF UCAV (UNMANNED COMBAT AERIAL VEHICLE)

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This paper focuses on increasing the usable lift coefficient of a flying wing configuration applied on an UCAV. The lift coefficient is increased for improving performance of flying wing for moderate and low angle of attack at subsonic speeds. The leading-edge vortex lift is tailored for better performance by postponing the angle of attack beyond operating conditions. A base line configuration of delta wing is modified by changing the airfoil, twist, leading edge radius to delay the vortex lift phenomenon at higher angles of attack. The basic model is first designed and analysis with CFD software and latter experimentally tested for various angles of attack in wind tunnels at various speeds and the coefficient of lift is calculated. There are two types of design philosophy for the UCAV I. The leading-edge vortex lift for flying wing is tailored for increment in coefficient of lift. II. The leading-edge vortex is postponed to angle of attack beyond the operating condition. A combination of these numerical results and experimental data lead to a proper understanding of the complex flow structure. Furthermore, this paper addresses the necessity for the predictability and understanding of controlled and uncontrolled flow separation, together with the interaction of the corresponding vortex systems in order to estimate stability and control issues for the entire flight envelope.

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# AEROSPACE ENGINEERING

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