ACHARYA AERO MAGAZINE

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All good things begin with the promise of something new and exciting. This newsletter is one such endeavor that I am really excited about. Starting now, the Acharya Aero Magazine will showcase the exemplary work done by our faculty and students alike. The milestones, the achievements, the awards and brave new steps towards excellence will all be recorded in these pages for a long time.

-Dr. S K Maharana
Chief Advisor

The department of Aeronautical Engineering takes immense pride In unleashing the first ever e-magazine of department 'Acharya Aero magazine'.

Knowledge and experiences are always worth sharing.

I hope this platform shall be fruitfully used by the fraternity of Aeronautical Engineering to share and showcase their impeccable works .

-Ms Steffi Thangachan
Editor in chief

The magazine has given all the budding talents a platform to put forth their ideas.

As years pass by it'll become a medium to share knowledge.

As students it is an honor to be part of this new endeavor.

We look forward for more people utilizing this platform in the forthcoming issues.

- The Student Editorial Board

FOOD FOR THOUGHT

"

For last year's words belong to the
last year's language
And next years words await another voice.
And to make an end is to make a beginning.

"

- T S Elliot

VISION

The Department of Aeronautical Engineering is committed to providing quality
education fostering excellence in academics, research and innovation to produce
aeronautical engineers who can contribute to society on a global scale.

MISSION

M1: To provide outcome-oriented learning that is based on research and innovation.

M2: To encourage cross-disciplinary learning and interaction with the global
community.

M3: To enable a holistic education that is deeply rooted in social values.

SPACE DEBRIS AND SPACE DEBRIS COLLECTOR

-Tejas Patil

The term space debris is referred to the natural debris found in the solar system: Asteroids, comets, and meteoroids. Space debris also includes artificially created objects, such as old satellites and spent rocket stages. As of 2016, the United States tracked a total of 17,852 artificial objects in Earth's orbit. More than 170 million debris smaller than 1 cm, and around 29,000 larger debris were tracked. Debris collision has become a hazard to solar panels and optics like telescopes.

SOME OF THE ACCIDENTS

1. On 24 July 1996, French micro satellite Cerise was hit by fragments of an Ariane-1 H-10 upper-stage booster.

2. The first major satellite collision occurred on 10 February 2009. The deactivated 950 kg Kosmos 2251 and 560 kg Iridium 33 collided 800 km over northern Siberia. The relative speed of impact was about 42,120 km/h .

3. On 22 January 2013 BLITS (a Russian laser-ranging satellite) was struck by debris from the Chinese anti-satellite missile test

SPACE DEBRIS COLLECTOR:

Space debris collector reduces the debris revolving in the orbit of satellites. Most of the collectors prefer magnetic field method ,in which magnetic properties of the debris is used to collect it.

SOME IDEAS ON SPACE DEBRIS COLLECTOR:

1. A simple idea is to use huge electromagnetic spheres which will produce strong magnetic fields.

2. With the help of launch vehicle ,the spheres are deployed in the proximity of debris, which gets accumulates at the surface due to the magnetic field. After this the spheres are made to enter the earths atmosphere and fall in the oceans.

Hence , there can be significant reduction in space debris.

ADVANTAGE OF THIS IDEA:

These spheres are recyclable and are robust as they don't carry any sensitive device which Is prone to damage.

Recycling reduces the overall cost.

MY ATLANTIS

Banished from the world
I drifted away
Became a part of something more.
As the ocean engulfed the land,
Nothing was left dry
Nothing was left alive.
A desert under the ocean
Removed from the maps;
The land begged for mercy.
Submerged into the ocean,
Sheltered from the sun's rays,
Hidden from the velvet moon,
In this deep dark abyss,
I found my home.
My Atlantis was cursed
To be never found.
On this ethereal land of nothing
I slay my monsters,
I built the paradise;
A strong fortress protecting my treasure
From being hunted again.

- Pink Poet

Uttkarsha Gupta

WHAT'S TRENDING?

MIT engineers fly first-ever plane with no moving parts.

The silent, lightweight aircraft doesn't depend on fossil fuels.

Instead of propellers or turbines, the light aircraft is powered by an "ionic wind" — a silent but mighty flow of ions that is produced aboard the plane, and that generates enough thrust to propel the plane over a sustained, steady flight.

SOCIETY! REDEFINE YOURSELF

Society: Do you know, knowledge is all about answering the right questions at right time.

Knowledge: I think I am all about learning and sharing with each other.

Society: Education system- University, College, Class, Book, Note, Exam, Result, Certificate.

Creativity: They never appreciated me.

Imagination: I am still searching my place to fit in.

Society: You are 10 minutes late. You are not allowed to enter the classroom.

Time: I know he still has 40 minutes to learn.

Society: He is the best in organizing events. Let him do that.

Event: Give everyone a chance to make mistake and learn.

Society: Can't take chance. We should do it perfectly.

Perfection: Anyway I don't exist. But you promised to be Progressive.

Society: I have all my rights.

Duty: Do you remember me, ever dealt with me, ever wondered about your contribution?

Society: Rules are rules.

Common sense: I do exist. Use me also sometimes.

Society: I know everything. I have every information I want.

Brain: I know I am invaded by these information. I lost my consciousness,

enthusiasm and curiosity.

Society: Listen, they got placed in Boeing.

See that couple looks just perfect.

Look, he is so dramatic.

Heard that she is good only on people's face.

Soul: Do you ever have time for me? I do need your care and concern.

Society: I have planned everything accordingly and I am working to achieve it.

Life: Bro, I am full of twists, turns and surprises. Live me the way I am.

- Roshan Ansari

MARS: OUR NEW HOME?

- Nishath Parveen

As far as humanity remembers, we humans have been voyagers. Exploring and conquering for survival has been in our blood since the very beginning. In 1969, when Neil Armstrong set foot on the moon, wonder and amazement filled the hearts of every individual.

When the search began to find a new home for the life on Earth, the red planet became the focus of possible human colonization. Mars has fascinated humans from centuries because of the environmental similarities existing between Earth and Mars. It is believed that millions of years ago, both Earth and Mars supported life. Whereas Earth thrived with life form, Mars was not so lucky and dried up.

Mars is about half Earth's diameter. Without spacesuits it is basically impossible to survive, as the atmosphere lacks oxygen, holds no heat and no pressure to prevent the blood from vaporizing.

Why go then ?

Ashwin Vasavada is a project scientist for Mars Science Laboratory, he says, "Visiting Mars is like going to early Earth. You remove that dusty exterior of Mars, and you have this planet that is just so reminiscent of Earth. Shake off the dust a little bit, and it's this amazing place that you can recognize. That's why I like it." We look to it and we see ourselves — our past and possibility, and, our future.

Elon Musk invoked the idea of exploration with his plans for terraforming of mars and developing space vehicles to transport human to Mars. It is an opportunity to carry forward not only life but the wisdom and knowledge that we humans cherish.

The journey to create new home on an alien surface will be harsh, with the results far beyond what one can imagine. Everything we learn about Mars throws up a new load of questions. Mars is a mystery. But one day all the questions shall be answered.

SOMETHING TO LEARN

TERRAFORMING:

Terraforming of Mars is a hypothetical process of planetary engineering by which the surface and climate of Mars would be deliberately changed to make large areas of the environment hospitable to humans, thus making the colonization of Mars safer and sustainable.

There are a few proposed terraforming concepts, some of which present prohibitive economic and natural resource costs.

RESEARCH PAPERS

Experimental Investigations of Aerodynamic Performances of S9023 Airfoil

K S Nandini, K N Subhashini and V Somashekar

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In the present work, it's proposed to study the aerodynamic characteristics of the S9023 airfoil for the various angle of attack with different Reynolds number. With a view to extending the knowledge of the aerodynamics of pressure distribution and lifting surfaces over S9023 airfoil has been measured in a low-speed subsonic wind tunnel. Experiments were carried out by varying the angle of attack, from 00 to 150 and the Reynolds number ranges from 1.3 X 105 to 4.5 X 105. The lift coefficient and drag coefficients for S9023 airfoil are obtained by measuring the pressure distribution from the pressure ports which is situated over the airfoil surface. The aerodynamics parameters at different Reynolds number is plotted i.e. Cp vs. x/c, Cp vs. y/c, Cl vs. α. Cd vs. α and L/D vs. α. The non-dimensional aerodynamics characteristics for S9023 2D airfoil described in details for different Reynolds number.

Establishing the temperature dependency of the aerodynamic drag

Shahid Khan

International Journal of Innovative Research and Science Technology

Objective: The study focuses on finding whether the temperature plays a role in the aerodynamic drag experienced by the moving body or not.

Method: This paper presents a first assessment on the impact of temperature on the aerodynamic performance. Numerical simulations using XFLR5 software for various temperature has been studied were performed in order to evaluate the impact of lift and drag on a 2D airfoil NACA24112 for UAV's. The results show clear evidence that as the temperature increases, the drag increases while decreasing the lift and the maximum angle of attack.

Findings: The study revealed the temperature dependency of drag. It tends to increase with temperature.

LET'S THINK SMART

-Mounika R

The term "smart structures" is commonly used for structures which have the ability to adapt to environmental conditions according to the design requirements. As a rule, the adjustments are designed and performed in order to increase the efficiency or safety of the structure. Combining "smart structures" with the "sophistication" achieved in materials science, information technology, measurement science, sensors, actuators, signal processing, nano technology, cybernetics, artificial intelligence, and biometrics, one can talk about Smart Intelligent Structures. In other words, structures which are able to sense their environment, self-diagnose their condition and adapt in such a way so as to make the design more useful and efficient.

There are a wide range of different smart materials. Each offer different properties that can be changed

1 Shape-memory alloys
2 Piezoelectric materials
3 Quantum-tunneling composite
4 Electroluminescent materials.
5 Color-change materials.

The concept of Smart Intelligent Aircraft Structures offers significant improvements in aircraft total weight, manufacturing cost and, above all, operational cost by an integration of system tasks into the load carrying structure. It also helps to improve the aircraft's life cycle and reduce its maintenance.Individual morphing concepts also have the ability to decrease airframe generated noise and hence reduce the effect of air traffic noise near airports. Furthermore, cruise drag reductions have a positive effect on fuel consumption and required take-off fuel load.

Another component of an "intelligent" aircraft structure is the ability to sense and diagnose potential threats to its structural integrity. This differs from conventional non-destructive testing (NDT) by the fact that Structural Health Monitoring (SHM) uses sensors that are permanently bonded or embedded in the structure. Composite materials, which are highly susceptible to hidden internal flaws which may occur during manufacturing and processing of the material or while the structure is subjected to service loads, require a substantial amount of inspection and defect monitoring at regular intervals.

Thus, the increasing use of composite materials for aircraft primary structure aircraft components increases substantially their life cycle cost. According to some estimates, over 25% of the life cycle cost of an aircraft or aerospace structure, which includes pre-production, production, and post-production costs, can be attributed to operation and support, involving inspection and maintenance. With sensing technology reducing in cost, size and weight, and sensor signal processing power continuously increasing, a variety of approaches have been developed allowing integration of such sensing options onto or into structural components.

Although available in principle, none of these SHM technologies have currently achieved a sufficient level of maturity such that SHM could be reliably applied to real engineering structures. A real reduction of life cycle costs related to maintenance and inspections can only be achieved by SHM systems designed as "fail-safe" components and included within a damage tolerance assessment scenario, able to reduce the inspection times (or their intervals) by investigating the structure quickly and reliably and avoiding the time consuming disassembly of structural parts.

AERO FACTS

The world's fastest airplane is the Lockheed SR-71 Blackbird, flying at 2,193 miles per hour. It has held the record for nearly 40 years. It had a cruise speed of 3.2 Mach at an altitude of 81000 ft.

PEO'S and PSO'S

PEO1: Employability: Graduates of the programme shall have the abilities required
for employment in the core industries, academic fields, and multidisciplinary fields.

PEO2: Advancement: Graduates of the programme shall have professional advancement in the management, entrepreneurship and industries.

PEO3: Contribution: Graduates of the programme shall have creative ideas and the
potential to support the aviation industry needs
.

PEO4: Lifelong learning: Graduates of the programme shall have a never-ending
desire to learn and be able to adapt new technology developments to the needs of
changing industrial environments.

PSO1. The ability to apply aeronautical engineering fundamentals in the sphere of industries such
as aerospace.

PSO2. The ability to translate numerical and experimental results for propulsion systems,
structural components, flight vehicle aerodynamics, and control systems.

PSO3. The ability to advance in the chosen field.

PSO4. The ability to broaden the scope of learning to include socially relevant activities.

Artwork from our Students

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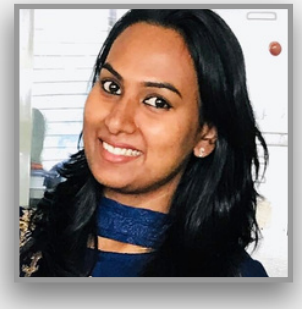

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