Electrikus...

Issue 2
June 2013

As the chiefs say

From an initiative 3 years back to a tradition now, The e-newsletter has explored all limits of knowledge. I extend my heartfelt greetings to all participants, authors, faculty staff and students associated in this endeavor.

Er. DC Jain
Chairman
(Gyan Ganga Group)

It is a matter of great happiness to me to know that the students have continued the e-newsletter for such a long time with great efficiency. Each edition comes out better than the previous and I have similar hopes from this one.

Mr. Rajneet Jain
Secretary
(Gyan Ganga Group)

I am very pleased to know that our college team is coming out with another issue of the e-newsletter. I heartily congratulate the editorial team. We expect to put a lot of technical knowledge to the readers from this e-newsletter.

Mr. Pankaj Goyal
Executive Director
(Gyan Ganga Group)

This effort of the students will be surely appreciated by one and all. Along with academics, the different activities in college are the keys that will unlock the hidden talents and thoughts in students.

Mr. Apurva Singhai
Executive Director
(Gyan Ganga Group)

It is joyous to know that the students are continuing the legacy of the e-newsletter as it shall help in spreading the activities being conducted by the institute to the public. I wish the team good luck.

Dr. Maneesh Choubey
Group Director
(Gyan Ganga Group)

It gives me immense pleasure to know that another edition of Electrikus is coming out. I wish all the success to the team of the EC branch involved and hope that this edition will also benefit the students in a great manner.

Dr. RK Ranjan
Principal
GGITS, Jabalpur

I am confident that this e-newsletter will provide relevant data about technology and latest happenings around the globe to all the budding engineers of our college. My best wishes to the team for future prospects.

Prof P.K. Jain
Head(Examination Cell)
GGITS, Jabalpur

This new edition of Electrikus has loads of exciting updates. Technology and time never stop and the updates here keep account of the latest developements.My warm wishes to the Gyan Ganga Group for the publication of this e-newsletter.

Prof. Vinod Kapse
Head (EC Department)
GGITS, Jabalpur

With already the so many incredible issues previously, I congratulate the editors on handling the pressure well and coming out with yet another brilliant edition of Electrikus. We truly are "Committed for Excellence".

Prof. Pankaj Sahu
Faculty Co-ordinator

From the editors

Mitul Chakraborty - 6th Semester

in this new edition we have tried to experiment a bit hope people appreciate it. Happy Reading.

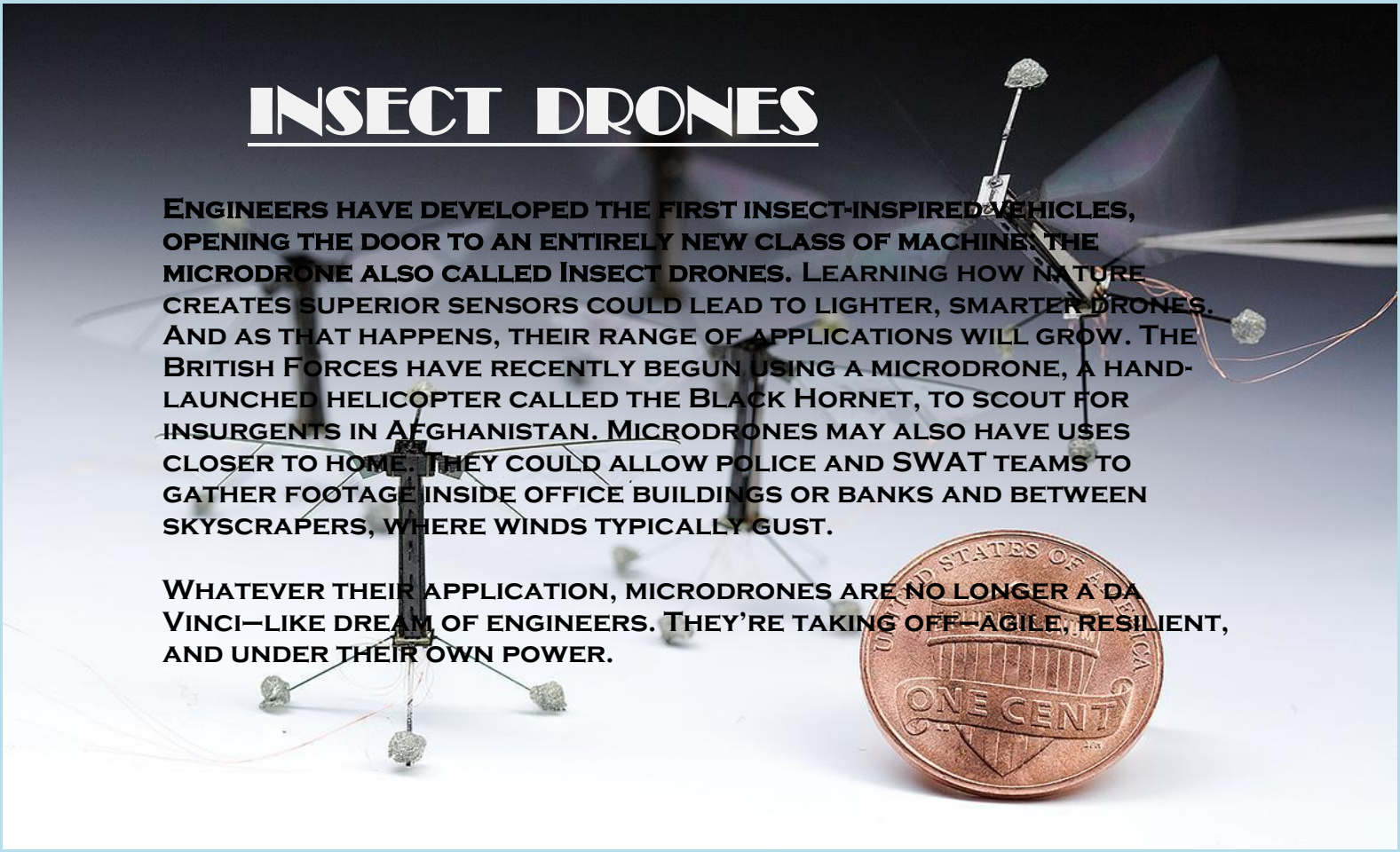
Abhishree Chowdhary - 4th Semester

Appreciation is the best reward of Hard work. Hope that everybody likes the work and appreciates it.

IN THIS EDITION :

VISION

"To be centre of excellence in teaching-learning and employability in various fields of Electronics and Communication Engineering to produce globally competent, innovative and socially responsible citizen."



Mission

1. To offer high quality graduate and post graduate programs in Electronics and Communication with strong fundamental knowledge and to prepare students for professional career or higher studies.
2. To foster spirit of innovation and creativity among students, faculty and staff, promote environment of growth, participation in conferences, technical and community services and lifelong learning for all.
3. To discover and disseminate knowledge through learning, teaching, sharing, training, research, engagement and creative expression.

SMART DUST

Smart dust is a tiny dust size device with extra-ordinary capabilities. Smart dust combines sensing, computing, wireless communication capabilities and autonomouspower supply within volume of only few millimeters and that too at low cost. These devicesare proposed to be so small and light in weight that they can remain suspended in the environment likean ordinary dust particle. These properties of Smart Dust will render it useful in monitoring real world phenomenon without disturbing the original process to an observable extends. Presently the achievable size of Smart Dust is about 5mm cube. Individual sensors of smart dust are often referred to as motes because of their smallsize. These devices are also known as MEMS, which stands for micro electro-mechanical sensors.

Smart Dust requires both evolutionary and revolutionary advances in miniaturization, integration, and energy management. Designers can use micro electromechanical systems to build small sensors, optical communication components, and power supplies, whereas microelectronics provides increasing functionality in smaller areas, with lower energy consumption. The power system consists of a thick-film battery, a solar cell with a charge-integrating capacitor for periods of darkness, or both

Smart Dust's full potential can only be attained when the sensor nodes communicate with one another or with a central base station. Wireless communication facilitates simultaneous data collection from thousands of sensor.

The 'Smart Dust' project is aiming to build an autonomous sensing, computing, and communication system packed into a cubic-millimeter mote, to form the basis of integrated, massively distributed sensor networks. So, this device will be around the size of a grain of sand and will contain sensors, computational ability, bidirectional wireless communications, and power supply, while being inexpensive enough to deploy by the hundreds. Smart Dust requires evolutionary and revolutionary advances in integration, miniaturization and energy management. If the project is successful, clouds of smart dust could one day be used in an astonishing array of application, from following enemy troop movements and hunting send missiles to detecting toxic chemicals in the environment and monitoring weather patters around the globe.

Before the age of the smartphone, mobile phone manufacturers were locked in an arms race to see who could create a smaller, but still usable device. Smartphones came along, and now the arms race is more or less focused on how big a screen can be while still being accepted by consumers. During this arms race, the way to keep phones from being unwieldy is to make them thin. Researchers have created a new supercapacitor so small that if it were used in smartphones, could make the devices even thinner and lighter than they are now.

Normally, electrodes in supercapacitors are made from carbon or polymers that can conduct electricity with ease. Researchers at Leibniz Institute for Solid State and Materials Research in Dresden, led by Oliver G. Schmidt, turned away from the usual electrode materials and instead used manganese dioxide — an unconventional choice, because the material isn't known for being adept at conducting electricity. However, the material is cheaper than the usual electrodes, and also not as harmful to the environment. So, in order to make manganese dioxide conductive, the team turned to something a supervillain might to do a captive hero: vaporize it with an electron beam.

Once the manganese was vaporized,the atoms in the vaporized gas reformed into thin, flexible strips. The strips were still as conductive as the non-gaseous manganese dioxide, so the team connected thin layers of gold to the films, increasing the conductivity. The team found that the new micro-supercapacitor was not only flexible enough to save some space and shrink down the size of mobile devices, but that it also stored more energy and provided more power per unit volume than its competing supercapacitors.,

The researchers aimed at creating the flexible supercapacitor with a high energy density, but at a low cost. Adding the gold to help achieve that high energy density, unfortunately, increased the cost beyond an acceptable amount. If there's something to take from this experiment, though, it's that the supercapacitor itself was a success, and bringing it to to the consumer market is more about cost now than anything else.