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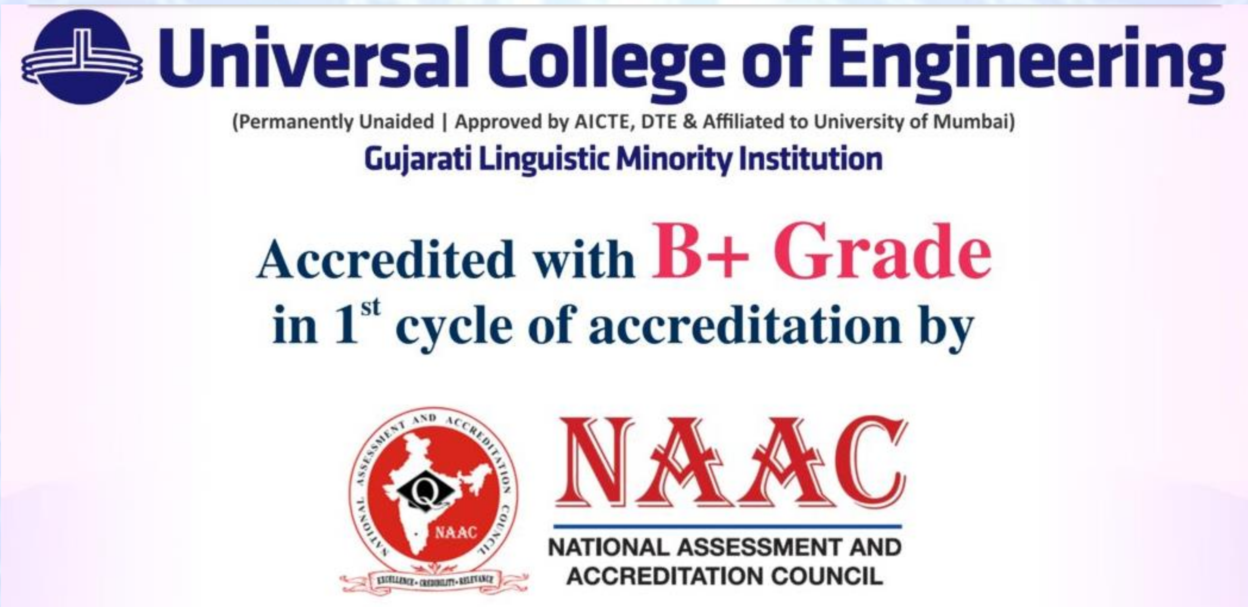
ELECTROBUZZ

ELECTRONICS DEPARTMENT



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Rohde & Schwarz Announces Test Chamber for Automotive Radar Chips

The test system for automotive radar features the ATS1500C antenna test system and AREG100A automotive radar echo generator for precision target simulation at varied distances.

Rohde & Schwarz has unveiled a new antenna test system for automotive radar chips, built to provide far-field testing performance.

Vehicle-based radars are one of the prominent technologies found in automotive ADAS (Advanced Driver Assistance Systems), which are designed to assist the driver during travel or parking for increased driver and road safety.

The system combines the compact R&S ATS1500C automotive radar test chamber designed for far-field applications with the R&S AREG100A radar echo chamber for precision target simulation at varied distances.

Combined, the technologies produce a precision platform aimed to help automotive manufacturers test their latest chips.

ATS1500C

On the ATS1500C side, the test chamber is outfitted with a CATR (Compact Antenna Test Range) reflector, which generates a 30cm diameter quiet zone for testing frequencies ranging from 77GHz to 81GHz.

It also features a 3D tilt-tilt positioner, which allows for the testing of automotive radars. The interior is similar to rooms outfitted with foam acoustic absorbers, and in this case, the design cancels out ghost targets during simulations.


Researchers come out with the latest stretchable, degradable semiconductors

To seamlessly integrate electronics with the natural world, materials are needed that are both stretchable and degradable, for example, flexible medical devices that conform to the surfaces of internal organs, but that dissolve and disappear when no longer needed. However, introducing these properties to electronics has been challenging. Now, researchers have developed stretchable, degradable semiconductors that could someday find applications in health and environmental monitoring.

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Semiconductors, which are essential components of almost all computers and electronic devices, have properties somewhere between conductors and resistors. Most semiconductors are currently made of silicon or other rigid inorganic materials. Scientists have tried making flexible, degradable semiconductors using different approaches, but the products either didn't break down completely or had reduced electrical performance when stretched. Zhenan Bao and colleagues wanted to see if they could solve these problems by combining a rubbery organic polymer with a semiconducting one.

To make their new material, the researchers synthesized and mixed the two degradable polymers, which self-assembled into semiconducting nanofibers embedded in an elastic matrix. Thin films made of these fibers could

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be stretched to twice their normal length without cracking or compromising electrical performance. When placed in a weak acid, the new material degraded completely within 10 days, but it would likely take much longer in the human body, Bao says. The semiconductor was also non-toxic to human cells growing on the material in a petri dish. According to the researchers, this is the first example of a material that simultaneously possesses the three qualities of semiconductivity, intrinsic stretchability and full degradability.

According to a new research report pertaining to the wide band gap semiconductor market, the global wide band gap semiconductor market is expected to reach a value of US$ 3 Bn by 2027, expanding at a CAGR of ~22% from 2019 to 2027. According to the report, the global wide band gap semiconductor market would continue to be influenced by a range of macroeconomic and market-specific factors during the forecast period.

Most complete exploration of fly landing maneuvers to advance future robots

To inspire advanced robotic technology, researchers in the Penn State Department of Mechanical Engineering have published the most complete description of how flying insects land upside-down.

The paper was published today (Oct. 23) in *Science Advances*. "Through this work, we sought to understand how a fly executes the maneuvers of landing upside down in the blink of an eye," said Bo Cheng, assistant professor of mechanical engineering and lead author of the paper.

It's arguably the most difficult and least-understood aerobatic maneuver conducted by flying insects, according to Cheng.

"Ultimately, we want to replicate that in engineering, but we have to understand it first," Cheng said.

Along with Penn State's Jean-Michel Mongeau, assistant professor of mechanical engineering, and Pan Liu, doctoral student in mechanical engineering, Cheng aims to understand the biomechanical and sensory processes that flies use to land on different surfaces like ceilings and moving objects.

To gather their data, the team first examined the flies' inverted landing behaviors in a flight chamber using high-speed videography. Their study found that the insects usually execute four perfectly timed maneuvers to land upside down: they increase their speed, complete a rapid body rotational maneuver (likened to a cartwheel), perform a sweeping leg extension and, finally, land through a leg-assisted body swing when their feet are firmly planted on the ceiling.

The researchers also believe these actions are set in motion by a series of complex visual and sensory cues the flies perceive as they approach their desired landing spot.

"Within the blink of an eye, these flies can totally invert their body and land, which is quite spectacular," Mongeau said. "We see it all the time happening around us, but we've demonstrated the complexity of the maneuver. There is a lot of interest for robots to be able to do the same."

However, current robotic technology sorely lacks the speed and efficiency needed to execute the same maneuvers.

"We look at nature for inspiration," Mongeau said. "This helps drive the fundamental science of engineering, to understand how flies are able to solve these problems so we can apply them to future technologies."

In addition to advancing robotics, the implications of this work can also be applied to the field of neuroscience.


"How is a fly's nervous system able to do this so quickly?" Mongeau said. "This work reiterates how fast these maneuvers are executed within an extremely small nervous system. This data can lead to new hypotheses for understanding how brains function."

Collaborators on the project include Sanjay P. Sane, associate professor at the National Centre for Biological Sciences in Bangalore, India, and Jianguo Zhao, assistant professor at Colorado State.

The work was funded by a $500,000 grant from the National Science Foundation.


ELECTRIC VEHICLES

Climate plans are the order of the day in the presidential primary campaign because carbon pollution is a global threat of unique proportions. But it's worth asking whether candidates' plans are based in the reality of the climate, the economy and the election.

All three dimensions must come together for any climate plan to achieve its goals – and this is especially true when the subject is electric vehicles. There is no point in putting forward an EV plan that is so aggressive that it cannot be implemented even under the most auspicious economic circumstances. Nor is there a point in advancing an EV plan that would not yield significant climate benefits. And, if such a plan might hurt a candidate's chances in the election, it would be worse than pointless.

Following the lead of Governor Jay Inslee, who dropped out of the race earlier this fall, Senators Cory Booker, Bernie Sanders and Elizabeth Warren said they would require all passenger cars sold in the United States to be zero-emissions by 2030, while Senator Kamala Harris and Mayor Pete Buttigieg set a 2035 deadline.