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Press release, November 11, 2020

Successful high-fliers

FAU students win international contest New Flying Competition 2020

An aircraft that can take off and touch down vertically, which is efficient in its energy consumption and also flies autonomously: The "TechFak EcoCar" team from the Friedrich-Alexander-Universität Erlangen-Nuremberg (FAU) won the New Flying Competition 2020 (NFC) in Hamburg with its "Night Fury" flying model. The international student competition is dedicated to the construction of model aircrafts that address important aspects of tomorrow's flying.

Team TechFac EcoCar during a demonstration of their electric VTOL Copter "Night Fury" at Fraunhofer IISB in Erlangen. Bild: Kurt Fuchs / Fraunhofer IISB

This year, the task of the competition was to develop a flight model that can take off and touch down vertically according to the VTOL principle (Vertical Take-off and Landing) - an aspect that is becoming more and more important, especially with the increasing air traffic in densely

populated urban areas. One important guideline was that the design should achieve the same efficiency in horizontal flight as a conventional aircraft, which requires an extensive runway for take-off and landing. The students of the EcoCar team managed this successfully with their VTOL aircraft "Night Fury".

Versatile and Economical

"With an energy consumption of only 128 watt hours over a distance of 22 kilometers, including vertical take-off and touch-down and various flight operations, 'Night Fury' features very low energy consumption," explains mechatronics student Adrian Sauer, head of the EcoCar team. This is made possible by a particularly efficient design approach whereby the FAU team designed the aircraft around a classic quadrocopter configuration with four lift rotors and an additional thrust rotor. In combination with self-developed lightweight carbon-fiber structures and a highly efficient electric propulsion system, the design allowes a take-off weight of just ten kilograms, including the specified payload of two kilograms. "Although not explicitly required for the competition, 'Night Fury' is also capable of flying autonomously," adds Adrian Sauer.

In competition, 'Night Fury' has proven to be very reliable. The FAU students took first place with their model aircraft, followed by Team HORYZN from the Technical University of Munich and Team BEOAVIA from the University of Belgrade. The international field of participants included six groups from Germany, China, Mexico and Serbia.

Team TechFak EcoCar with the trophy for 1st place at the NFC 2020 and the electric VTOL Copter "Night Fury" in front of the Fraunhofer IISB in Erlangen. Bild: Kurt Fuchs / Fraunhofer IISB

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Team TechFak EcoCar

The TechFak EcoCar team was founded at the FAU Faculty of Engineering in 2008. In this team, students work on challenging projects for the mobility of the future in their spare time or as part of their final theses. An electric car and an electric motorcycle were already developed and built, but the group's current focus is on electric flying. In their work, the students are supported by the infrastructure and power electronics expertise of the Fraunhofer Institute for Integrated Systems and Device Technology IISB, a close cooperation partner of FAU.

The New Flying Competition takes place every two years since 2016 and is an initiative of Neues Fliegen e.V., an association that originated from the Hamburg University of Applied Sciences.

Further information is available on the TechFak EcoCar homepage:
https://www.ecocar-stud.de

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About Fraunhofer IISB

As one of the 74 institutes and research units of the Fraunhofer-Gesellschaft, the Fraunhofer Institute for Integrated Systems and Device Technology IISB conducts contract research for industry and public authorities. Its main objective is to provide excellent research to its customers and to set technological benchmarks as one of the leading research institutions in electronic systems. For this, about 250 employees plus numerous students work on a broad range of power electronics for mobility, industry, and energy supply, semiconductor devices and technology, packaging and modules, and materials development. This is supplemented by broad activities in test and reliability, simulation, characterization, and metrology.

In addition to silicon technology, the IISB has a strong focus on wide-bandgap semiconductors, especially silicon carbide (SiC). For SiC, the institute offers a complete technology backbone, including materials science, devices, modules, and their integration in highly efficient power electronic systems.

Besides its headquarters in Erlangen, Fraunhofer IISB has branches in Nuremberg and Freiberg / Saxony. The institute closely cooperates with the Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) and is a foundation member of the "Energie Campus Nürnberg" (EnCN) as well as the "Leistungszentrum Elektroniksysteme" (LZE). IISB pursues cooperation with numerous national and international partners in joint projects and associations.