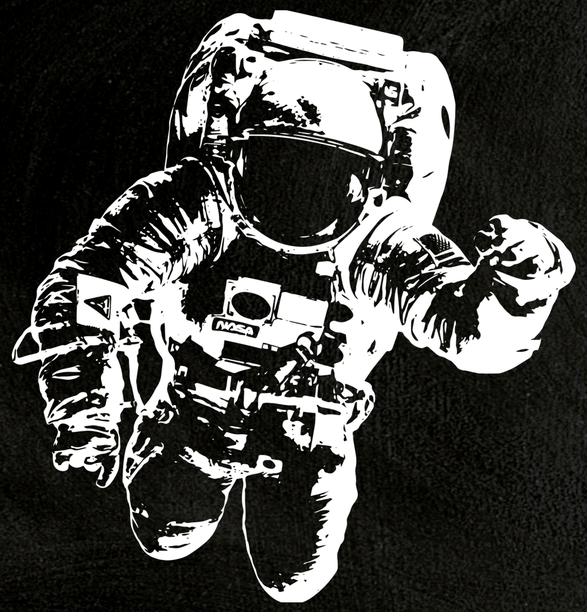
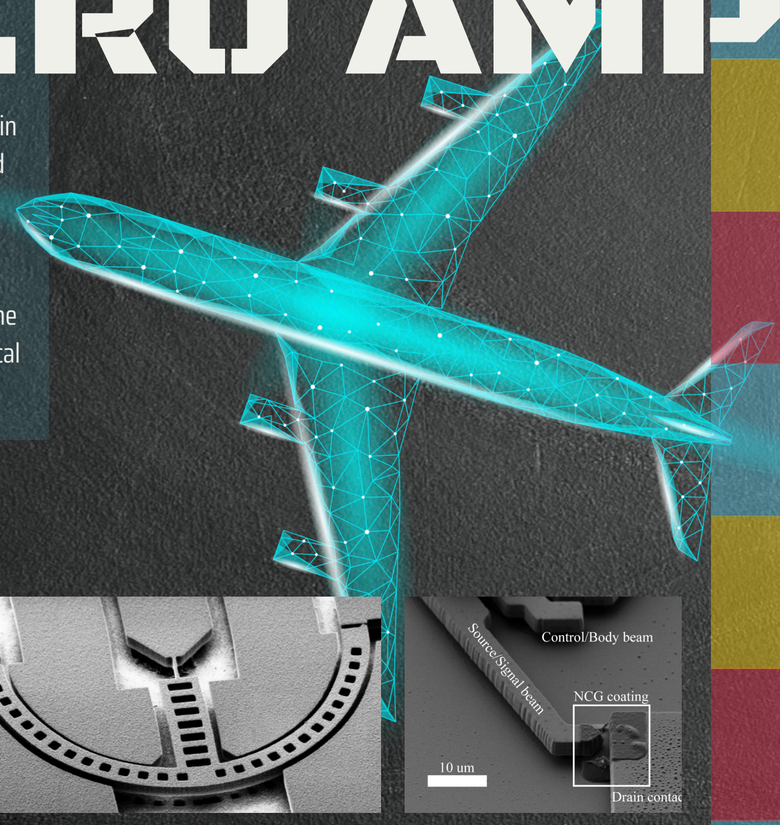
ZERO AMP



Overview

From mobile phones to cars and satellites, transistors are the building blocks of the microelectronics found in common electronics. However, more and more emerging technologies require ultra-low power sources and are operating at low power in harsh environmental conditions where current transistors cannot perform efficiently. Additionally, these electronic devices require the benefit of integrated Artificial Intelligence.

The world has increasing needs for these intelligent devices. To tackle this challenge, Zeroamp is pushing the limits of transistors to develop tough and energy-efficient chips; we will develop novel nanoelectromechanical (NEM) switches that can survive extreme environments.



Future Applications

Autonomous nodes in the Internet of Things require extremely energy-efficient processors with zero standby power. They will also benefit from integrated intelligence enhanced by NEM switch technology to reduce communication burden with the cloud.

The ruggedness of NEMs technology enables electronics that operate in extreme conditions, such as those found in space, aerospace and industrial applications.

ZeroAMP Will Be Used In The World Of Interconnected Internet Of Things Devices.

Our Strategies

In ZeroAMP, we aim to build electronic components comprising logic and Non-Volatile Memory (NVM) to meet the needs of emerging applications that require reliable operation in extreme environments while maintaining a very high energy efficiency.

By combining novel energy-efficient circuit architectures with new materials, we will reduce device count and eliminate leakage in both logic and memory. This includes at all operational temperatures (at near cryogenic temperature and up to 300°C). NEMs switches can also withstand extremely high levels of radiation. Finally, we aim to achieve an operational energy efficiency that is 50% of conventional CMOS (normal silicon chips).

NEM Logic Switch

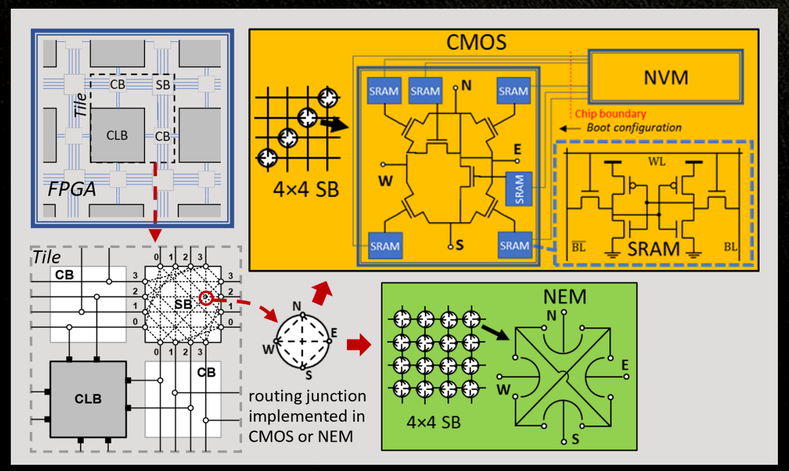
NEM Memory Switch

Our Vision

The goal of ZeroAMP is to develop logic and memory circuits with ultra small mechanical switches (called NEM Switches) using silicon technology. It will be used in emerging applications demanding chips that can withstand harsh environments, for example, zero standby power, operating temperatures up to 300°C, and radiation hardness.

The future of NEMS lie in Artificial Intelligence; NEMS will be developed further to allow microchips to become more intelligent. An example is a MEMS sensor operating on one chip than runs autonomously by relying on its own intelligence. This saves unnecessary communication between the device and the cloud, resulting in faster response times and a lower cost product.

A Comparison Of FPGA Switch Box Structures For NEMS And CMOS:



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The ZeroAMP project is a joint effort of 7 partners from industry, research institute and academia from four different European countries. The project started on 1 January 2020 and will run until 31 December 2023.