NANUSENS
SPACE SAVING MEMS SOLUTIONS

INTEGRATED WITH CONTROL ELECTRONICS INTO SINGLE DIE TO FREE UP SPACE

FREE EVEN MORE SPACE BY COMBINING WITH MULTIPLE NANO-SENSORS ON SAME DIE

High performance
Ultra-rugged
Ultra-low power
Frees space for more features
Easy design in
Longer battery life
NANUSENS – THE HEART OF THE NEXT GENERATION OF SENSORS

NANUSENS SPACE SAVINGMEMS SOLUTIONS

Nanusens is freeing up space inside products by creating MEMS sensors that are up to ten times smaller by making them within the CMOS layers. Our unique technology creates nanoscale, multi-sensor solutions all within the same die along with the control electronics to free even more space. Yet more space can be created by combining them with our nanoscale, RF Digital Tuneable Capacitor MEMS.

EARBUDS WITH UP TO 20% LONGER LIFE

Our proprietary technology can significantly increase the operational life of earbuds by up to 20%. This can be achieved by replacing the MEMS sensors in an earbud with a single multi-sensor chip solution that is up to ten times smaller, freeing up space for larger batteries.

A MEMS (Micro Electro Mechanical Systems) sensor package contains a chip with the MEMS sensor, which is made on the microscopic scale, and a chip with the control electronics resulting in a volume of four cubic millimetres. Nanusens creates its sensors on the nanoscale within the layers of its CMOS chip that also has the control electronics. As a result, the NEMS (Nano Electro Mechanical Systems) chip is only one cubic millimetre so this will create a saving of three cubic millimetres for every MEMS package that it replaces.

LONGER AUDIO ON THE GO™

We are in a unique position of being able to provide more space inside earbuds for designers to use as they wish to give a better user experience. While some manufacturers want more battery life by using a larger battery or a super-capacitor, others want to use some of this freed-up space for features such as memory so that songs can be stored locally on the earbud. This is another way to extend the battery life as songs would not need to streamed over Bluetooth, giving longer audio on the go™.

MORE SENSORS CREATE GREATER SPACE SAVINGS

The more MEMS packages are replaced and their functions done by a multi-sensor Nanusens chip, the greater the space savings. Plus the Nanusens chip size only increases slightly with every additional sensor function to accommodate additional control electronics. In addition, far less PCB estate is needed for the tiny, single chip solution compared
OUR ROADMAP HAS SENSORS FOR IOT, WEARABLES, SMARTPHONES, AND EARBUDS.

NEW NANOSCALE, RF DIGITAL TUNEABLE CAPACITORS UNLOCK THE POWER OF 5G.

Nano-sensors created inside the CMOS layers using standard CMOS process.

Integrates the nano-sensor with the control electronics in a single die. Many different kinds of sensors in one Nanusens die.

The more nano-sensors in one die, the greater the space saving compared to standard, single-function MEMS.

to the PCB estate required for several MEMS packages. This provides companies with a roadmap of exciting additional features to enhance the user experience such as controlling the earbuds with head gesture recognition.

PRODUCT ROADMAP
The first product from Nanusens will be a 2D motion detector for earbuds in Q4 2019, which can be used to implement tap and double tap for control, wake-on-movement and sleep-on-rest functions, and, soon after, a 3D accelerometer. A bone conduction sensor for noise cancellation is next to be integrated into the single chip solution. Chips will be available in a small package such as WLCSP or as bare die that can be attached directly to the PCB.

RF SWITCHES FREE UP SPACE IN PHONES
We have also used our innovative technology to create DTCs (Digital Tuneable Capacitors) or RF switches for 5G smartphones. Again, by shrinking the MEMS into the CMOS layers along with the control electronics on the same die, we save space.

Our DTC MEMS cover the range from 500MHz to 6GHz by digitally adjusting the capacitance from 500fF to 1.5pF with roughly 60pF intervals. They combine unprecedented low power consumption with high performance and ruggedness for high shock survivability.

NEMS - THE NEXT GENERATION OF MEMS
MEMS sensors are created using expensive proprietary processes. Nanusens’ multi-patent pending technology enables us to create nano-products inside the CMOS layers using standard CMOS processes within the same production flow as the rest of the chip production. This innovative approach reduces the size and cost.

NANO-PRODUCTS MADE USING STANDARD CMOS PROCESSES
The Inter Metal Dielectric (IMD) is etched away through the pad openings in the passivation layer using vapour HF (vHF) to create the nano-structures. The holes are then sealed and the chip packaged as necessary. As only standard CMOS processes with minimal post-processing are used and the NEMS can be directly integrated with active circuitry as required, they can potentially have high yields similar to CMOS devices. This also means that the production is fab-independent.

REVOLUTIONISING THE MEMS MARKET
We believe that our disruptive technology will revolutionise the MEMS market and meet the ever-increasing demand for lower cost MEMS sensors in smartphones, wearable technology and IoT devices that has already made sensors a multi-billion-dollar industry as they provide the vital interface between the real world and the electronics.

The nanoscale of this technology means that it has ultra-low power consumption. Importantly for use in a device that is likely to be dropped, our designs are more robust and reliable than other MEMS designs.

Our products offer a unique combination of significantly smaller solutions, lower power needs, ruggedness, and multifunctionality in a single integrated chip so, after earbuds and phones, we will be bringing our nano-solutions to the wearables and IoT markets.
ABOUT US

Nanusens is a VC-funded, UK-based company that specialises in creating nano-sensors inside CMOS. Its expertise and pending patents place it as the uncontested leader in this technology that will revolutionise the next generation of sensors.

Longer audio on the go
is a trademark of Nanusens Limited