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## **Memscap adds multi-user MEMS process**

PARIS — Memscap SA, French provider of micro-electromechanical systems (MEMS), announced it has extended its MUMPs (Multi-User MEMS Processes) manufacturing and prototyping services with the introduction of a nano-platform.

The Nano MUMP platform, claimed the Grenoble-based company, creates submicron features on MUMPs polysilicon wafers. "It is the first time such a manufacturing and prototyping service is offered on the nanoscale (below 1 $\mu$ ) for mechanical structures."

The applications for this process range from mirrors to fuel cells, through fluidics, renewable energies, accelerometers and medical/biomedical applications, noted Memscap.

The Nano MUMP platform adds to the existing runs, namely Poly MUMPs, SOI MUMPs, Metal MUMPs.

The PolyMUMPs process, Memscap specified, is based upon the deposition of the following layers onto a Si substrate: a nitride isolation layer, a polysilicon ground layer, two structural polysilicon layers, two sacrificial oxide release layers, and one metal layer for electrical connection and enhanced reflectivity.

SOI MUMPs utilizes a three mask silicon-on-insulator (SOI) process based upon a starting wafer consisting of layer thicknesses 10  $\mu$ m or 25  $\mu$ m, 1  $\mu$ m, and 400  $\mu$ m, for the silicon, oxide, and substrate, respectively. The silicon layer may be patterned and etched down to the oxide to form mechanical structures, resistors and electrical routing. In addition, the substrate can be back-etched to the oxide, enabling the construction of through-hole structures.

MetalMUMPs employs electroplated nickel as the primary structural and interconnect material. In addition to this, doped polysilicon layers may be used to form resistors or further mechanical structures. Electrical isolation is achieved through the deposition of silicon nitride and oxide is employed as a sacrificial layer. Trench layers may be etched into the substrate so as to achieve additional thermal and electrical isolation. Gold plating of the nickel sidewalls may be employed if low contact resistance is desired.

According to Memscap, the expertise gained with existing runs will enable to keep the same process length, allocate more space for devices on each run, give customers the possibility to compare the advantages of micro and nano processes before going to volume manufacture, and mostly, offer customers the most cost-effective manufacturing and prototyping services for nanomachines.

So far, Memscap concluded, more than half a million MEMS devices have been shipped to over 1000 customers over the life of the MUMPs program.