

# **Simulations of the microelectronic piezoresistive pressure sensors based on silicon-on-sapphire mesa structure disposed on Titanium alloy membrane**

**Орловский Государственный Технический Университет,  
ООО "ПромА", г. Орёл**

**Piezoresistive pressure sensors are one of the very-first products of MEMS technology. Those products are widely used from automotive and aerospace industry to household appliances. The "PromA" Company, Orel, Russia, produce microelectronic piezoresistive pressure transducers based on silicon-on-sapphire mesa structure disposed on Titanium alloy membrane and with Titanium alloy connecting pipe. Use of Titanium alloy makes transducer stainless and extremely light. Silicon-on-Sapphire pressure transducers are available in pressure ranges from 0-10 kPa to 0-150 MPa. They are also stable to ionizing radiation.**

**TCAD Lab at OrelSTU currently involved in project on piezoresistive pressure sensors simulations in cooperation with "PromA" Company, Orel, Russia. We use COMSOL Multiphysics as a simulation software based on the finite element method (FEM). Our simulations provide insight into strain and deformations distribution in sensor and allow for the device design optimization aimed on increase of response and sensitivity characteristics and on sensor miniaturization.**





**automotive**



**aerospace**



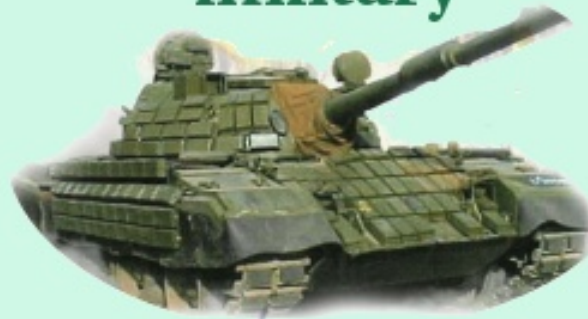
**military**



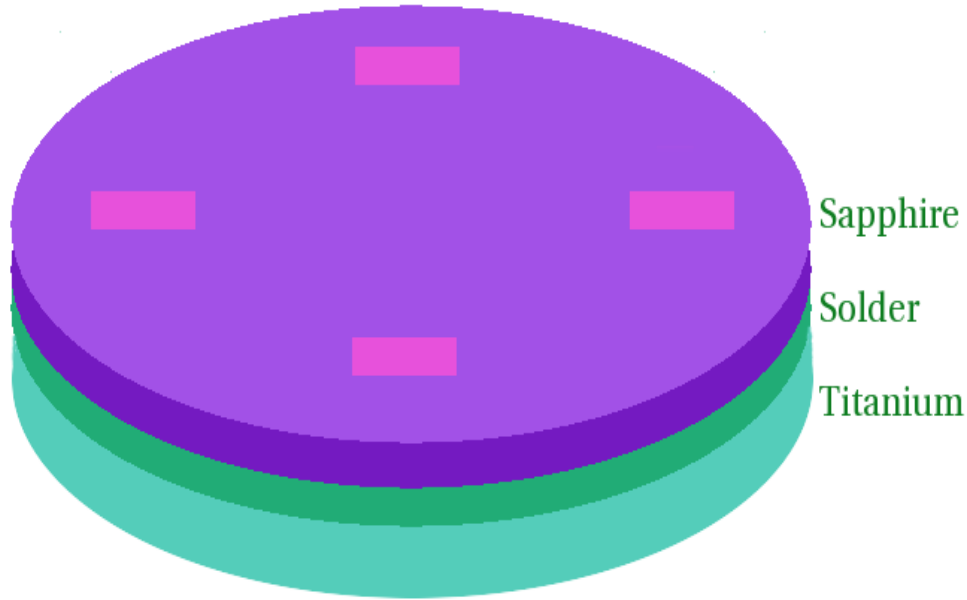
**rocket**



**petroleum**



4 Silicon resistors on the surface



Wheatstone bridge

