Title: Advanced Microfabrication and NMR Electronic Instrumentation Development

Proponents: Peng Weng Kung (INL) and Leonel Sousa (INESC ID), Susana Freitas (INESC MN)

Introduction:

With advances in microelectronics technology, magnetic resonance (MR) community sees the emergence of portable and compact MR spectrometer (i.e., pulse programmer, trans-receiver, and digital signal processing) on a highly integrated circuit platform (e.g., field programmable gate array, ASIC, integrated coils and field probes) targeting applications such as geological studies, disease diagnosis/monitoring, and precision agriculture at point-of-use setting.

Aims/goals:

INL and INESC (ID/MN) is seeking PhD students to work on a project aiming at designing and developing an integrated (chip scale), scalable, low power, low field (0.1T) Nuclear Magnetic Resonance (NMR) spectrometer.

Role of each partner:

Peng Weng Kung (INL) is an expert in NMR spectroscopic and many years of experience working on translating technology to clinical research. INL promotes international collaborations in cross disciplinary fields and is the center of excellence for nanotechnology instrumentation development. INL will hook up with an end user partner (hospital or food industry for instance).

Leonel Alves (INESC ID) is an expert in microelectronics and embedded system. The INESC-ID is a R&D institute dedicated to advanced research and development in the fields of Information Technologies, Electronics, Communications, and Energy, which integrate competences from researchers in electrical engineering and computer science to advance the state of the art in computers, telecommunications and information systems.

Susana Freitas brings in field excitation/sense microcoil fabrication and other field probe integrated technologies. INESC MN is a leading supplier of magnetic field sensing technology (DC to MHz).