

# Summary of Research achievements

## Barna Szabados

In the early seventies, Dr. Szabados pioneered the field of "Inductive Coordination", which is the interference between Power Systems and Telephone Systems. Even today his work represents about 70% of the known literature on the topic, and was the root of the inductive coordination programs in Canadian and US utilities.

A major part of his research efforts was to design instrumentation and measurement methodologies. He designed and created the first industrial standard harmonic measuring system on Power Systems. This principle was adopted by EPRI (via the McGraw Edison project) and even today's systems, although relying on more digital analysis, are still based on it. He designed the first digital tachogenerator measuring accurately zero speed, which has still not been matched with modern ultra-fast resources. He also designed in the mid seventies the first and only analog instrument to measure amplitude and phase angles of harmonics 80 dB below fundamental (even today's digital signal processor chip systems cannot meet this performance). In this process he developed the first measurement technique for harmonic currents generated by transformers (still the only valid method in use). This was subsequently used for calibration of high voltage current transformers at harmonic frequencies. In the late eighties he designed and implemented a special dynamic torque measurement system for induction motors intended to supersede the IEEE test standards. Recently he developed an original test methodology to measure accurately losses in large rotating machines, without having to connect the machines to a real load. This not only saves considerable energy to manufacturers, but for large motors direct measurement of losses was not possible.

In association with General Motors, he designed and implemented the first industrial practical fibre-optic LAN, first ever operational in a plant environment. It is still operational at the Oshawa GM plant used to monitor, display, and manage the assembly plant. This LAN is the "grandfather" of the MAP (manufacturing automation protocol) protocol in which his group was involved at its birth.

In the last decade his research efforts have been concentrating on energy conservation and power quality. He proposed a unique technology for zero emission vehicle power source management using high velocity flywheels to store energy.

But the most promising technology, dimming of linear fluorescent lights (including magnetic ballasts which has eluded researchers for the past four decades), has been successfully achieved. Field tests in a large office building, independently monitored by the power utilities, resulted in 62% energy savings. This leads into a major environmental and sociological impact with the growing demands for other installations, and contribute to demand side management. Presently Dr Szabados is the VP and Chief technical Officer in Fifth Light Technologies Inc.