R. Ionel and P. Demian, "A solution for integrating the Vector CANCase XL with the Teradyne Test Station ICT," *2018 International Symposium on Electronics and Telecommunications (ISETC)*, Timisoara, 2018, pp. 1-4.
doi: 10.1109/ISETC.2018.8583920

Abstract: This paper presents the functional technical approach and test results related to an integration between the Vector CAN Case XL (CCXL) module and the Teradyne In Circuit Tester (ICT). The proposed application is the achievement of a collaboration between two industrial partners: Continental Automotive Romania (Timişoara Plant) and Alfa Test S.R.L. The need for such an integration has originated in the context of permanent focus on innovative production solutions. Since for Continental Timişoara, Vector tools have become a traditional investigation means in the research and development process, an emerging requirement was the transfer of this technology towards the production flow. The Teradyne Test Station has been selected as the ICT which should host and use the CCXL in the functional test procedures applied to a dashboard PCB. The resulting software application is a prototype. According to the author's knowledge, there is no other similar integration which is used for production purposes. Some of the capabilities offered by this solution include: communication protocol administration between the ICT software interface and the CCXL, automated formatting of CAN messages, arithmetic conversions, CAN frames segmentation, selection of useful information embedded in exchanged frames or the combination of ICT based measurements interposed between CAN dialogs. The proposed software architecture has been validated by a series of experimental results performed on different product versions. As a reference, the First Pass Yield (FPY) parameter demonstrates that the proposed approach is viable and can be successfully used to fulfill its purpose.

keywords: {automatic test equipment;automobile industry;automobile manufacture;production engineering computing;project management;protocols;software architecture;steering systems;Circuit Tester;industrial partners;Continental Automotive Romania;innovative production solutions;production flow;CCXL;functional test procedures;ICT software interface;ICT based measurements;software architecture;Vector CANCase XL;Teradyne Test Station ICT;functional technical approach;Vector CAN Case XL module;software application;product versions;vector tools;Continental Timisoara;Timisoara Plant;Software;Production;Testing;Libraries;Prototypes;Robot sensing systems;Protocols;Technology Integration;CAN Communication;Vector CAN Case XL;Teradyne ICT;Automotive},
URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8583920&isnumber=8583840

R. Ionel, S. Ionel, P. Bauer and F. Quint, "Water leakage monitoring education: Cross correlation study via spectral whitening," *IECON 2014 - 40th Annual Conference of the IEEE Industrial Electronics Society*, Dallas, TX, 2014, pp. 2465-2471.
doi: 10.1109/IECON.2014.7048851

Abstract: This paper presents an educational experiment designed for enabling students to interact with a domain of great interest - leakage detection and monitoring. Students will create LabVIEW/MATLAB programs and will use already existing applications in order to get familiar with signal processing concepts like Cross Correlation, Time Delay Estimation and Signal Whitening. Their activity is supported by a real experimental installation which simulates a water transportation system with liquid loss. In addition to the educational component, a professional leak detection device (the Correlux P200) is used for experimental results validation. Consequently, the students benefit from understanding how such an instrument works.

keywords: {computer aided instruction;computerised monitoring;correlation methods;delays;engineering education;leak detection;mathematics computing;mechanical engineering computing;pipelines;signal processing;spectral analysis;student experiments;virtual instrumentation;water supply;Correlux P200;time delay estimation;cross correlation;signal processing concept;MATLAB;LabVIEW;educational experiment;spectral whitening;water leakage monitoring education;Filtering;Noise;Correlators;Monitoring;Correlation;Leak detection;leak detection;cross correlation;time difference of arrival;signal whitening;LabVIEW/MATLAB},
URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7048851&isnumber=7048466

R. Ionel, A. Gontean and P. Draut-Gherban, "Implementation of a CO concentration monitoring system using virtual instrumentation," *Proceedings of the 6th IEEE International Conference on Intelligent Data Acquisition and*

Advanced Computing Systems, Prague, 2011, pp. 152-155.
doi: 10.1109/IDAACS.2011.6072729
Abstract: Different types of gas sensors are used to implement applications which investigate ambient air pollution levels. Carbon monoxide (CO) concentration measurement is an integral part of dedicated environment monitoring stand-alone specialized systems. This paper presents an alternative solution for CO concentration monitoring, based on an original virtual instrumentation concept. The advantages of the proposed application include data logging, statistical calculations, remote access or software and hardware flexibility. Comparative experimental results are also provided.

S. Mischie and R. Ionel, "On detecting single-talk intervals in two-input speech separation systems," *ISSCS 2011 - International Symposium on Signals, Circuits and Systems*, Iasi, 2011, pp. 1-4.
doi: 10.1109/ISSCS.2011.5978728
Abstract: Considering mixtures of recorded speech sources, this paper presents a method for detection the time intervals where only one input source is active. Information theoretical criteria which are used for a more general class of sources, can give wrong results in some situations. We propose a different approach to solve the problem. Like the theoretical criteria specify, first, we compute the eigenvalues of the covariance matrix of the mixtures. Then, the eigenvalues ratios are used to find a threshold which allows us to establish if a time interval contains only one speech source. Experimental results, which use two or three mixtures of two speech sources and prove the quality of the proposed method, are also presented.

S. Mischie and R. Ionel, "Blind separation of speech using cochlear filtering," *2010 International Conference on Applied Electronics*, Pilsen, 2010, pp. 1-4.
Abstract: The paper presents a simple and efficient algorithm that separates three speech signals from two mixtures. Cochlear filtering and the ratio between the time-frequency representations of the two mixtures are used. It follows a method that works for both convolutive and instantaneous mixing models. Simulation results are also presented to confirm the proposed approach.

R. Ionel, A. Ignea and S. Ionel, "Remote automatic selection of suitable frequency intervals for improved leak detection," *9th RoEduNet IEEE International Conference*, Sibiu, 2010, pp. 246-251.
Abstract: Constant improvement of leak detection techniques in pipe systems used for liquids transportation is a priority for companies and authorities around the world. If a pipe presents leakage problems, the liquid which is lost generates specific signals which are transmitted in the material of the pipe. Using accelerometers these signals can be recorded and analyzed with the purpose of identifying the location of the leak. An important data analysis tool which helps in the process of leak detection is the Cross Correlation Function (CCF). It is calculated between two simultaneously recorded specific signals with the purpose of time delay estimation (TDE). TDE leads to the identification of the leak position. However, a traditional implementation of the CCF may not be satisfactory. Recorded signals are affected by noise coming from pipe elbows, junctions or traffic. Further improvements are necessary. This paper presents an

implementation of an algorithm which improves the quality of the calculated CCF. Being part of a more complex software application, the algorithm is based on the calculation of the coherence function (CF). The application will automatically select two frequency intervals (bands) for filtering the leak signals. After the filtering process, the calculation of the CCF shows an increased quality. The application can be accessed from distance if a remote user needs to study or save the CCF results. No filtering settings are required and the method assures good results.
keywords: {leak detection;pipe flow;remote automatic selection;frequency intervals;improved leak detection;pipe systems;cross correlation function;time delay estimation;coherence function;Frequency;Leak detection;Application software;Filtering;Liquids;Transportation;Signal generators;Accelerometers;Signal processing;Signal analysis;LabVIEW;leak detection;cross correlation function;coherence;automatic filtering;remote access},
URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5541571&isnumber=5541526

R. Ionel and S. Ionel, "The majority principle in TDOA estimation," *2010 8th International Conference on Communications*, Bucharest, 2010, pp. 21-24.
doi: 10.1109/ICCOMM.2010.5509107
Abstract: The time difference of arrival (TDOA) estimation as a particular time delay estimation (TDE) problem has many practical applications. One of them refers to leak detection and localization in fluid pipelines. This paper introduces the majority principle as a method to increase the probability of a correct localization of the leak, with important economic and environmental implications.
keywords: {delay estimation;time-of-arrival estimation;TDOA estimation;time difference of arrival estimation;time delay estimation;TDE;leak detection;fluid pipeline;Delay estimation;Pipelines;Leak detection;Time difference of arrival;Delay effects;Noise measurement;Environmental economics;Signal sampling;Signal processing;Attenuation measurement;leak detection;cross-correlation function;time difference of arrival;majority principle},
URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5509107&isnumber=5508957

R. Ionel, S. Ionel and A. Ignea, "Improved leak detection quality by automatic signal filtering," *2010 International Joint Conference on Computational Cybernetics and Technical Informatics*, Timisoara, 2010, pp. 425-430.
doi: 10.1109/ICCCYB.2010.5491234
Abstract: Constant improvement of leak detection techniques in pipe systems used for liquids transportation is a priority for companies and authorities around the world. If a pipe presents leakage problems, the liquid which is lost generates specific signals which are transmitted in the material of the pipe. These signals can be recorded using accelerometers. They are analyzed with the purpose of identifying the location of the leak. An important data analysis tool which helps in the process of leak position detection is the Cross Correlation Function (CCF). It is calculated between two simultaneously recorded specific leak signals with the purpose of time delay estimation. Time delay estimation calculations lead to the identification of the leak position. However, a traditional implementation of the CCF may not be satisfactory. Recorded signals are affected by noise coming from pipe elbows, junctions or traffic. All these unwanted noise sources can influence the aspect and accuracy of the CCF. Further improvements are necessary. This paper presents a Labview 8.5 implementation of an algorithm which improves the quality of the calculated CCF. Being part of a more complex software application, the algorithm uses the calculation of the coherence function. By analyzing the coherence the application will automatically select two frequency intervals (narrow bands) for filtering the leak signals. After the filtering process, the calculation of the CCF shows an increased quality. The application can be accessed from distance if a remote user needs to study or save the CCF results. No filtering settings are required and the method assures good results especially in the case of recorded signals which are highly affected by unwanted noise.
keywords: {correlation methods;data analysis;delays;filtering theory;leak detection;pipelines;leak detection quality improvement;automatic signal filtering;liquids transportation;pipe systems;leakage problems;data analysis tool;leak position detection;cross correlation function;time delay estimation;Leak detection;Filtering;Application software;Delay effects;Delay estimation;Liquids;Transportation;Signal generators;Accelerometers;Data analysis;Labview;leak detection;cross correlation function;coherence;automatic filtering},
URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5491234&isnumber=5491200

Abstract: The PC based virtual instrumentation is a dynamic and attractive alternative to the classic instrumentation. Its main advantages are: flexibility and adaptability, low cost, wide development of extension PC boards with measurements features, attractive representation of measurement results, in different forms, on the PC's monitor. The paper presents a system identification application with PC based (virtual) instrumentation. The virtual system is made of an external board, connected to the PC via the USB interface and a software tool, Agilent VEE (Visual Engineering Environment). The presented virtual system can work as a voltmeter, ammeter, signal generator, digital oscilloscope and power supply. The main contribution of the paper is the extension of the application domain of the virtual instrumentation system to system identification. The identification method consists of applying to the system input a binary pseudorandom signal (BPRS) and determining the impulse response of the system as being well approximated by the cross-correlation function between the input signal and the answer of the system. The application is intended for educational purposes but can be used in other areas too