

CASE STUDY

Germany

Automotive, Consultants

AKUSTEC

Implementation of PULSE into Automotive Test Cells

PULSE Solutions

Akustec, based near Munster, Germany, is a consultancy company which was founded by Mr. Wolfgang Metzen in 1990. Akustec works with many companies in the area of sound and vibration, including the automotive industry. Akustec has used and recommended the PULSE™ multi-analyzer platform since it was first introduced in 1996 and has implemented a number of special test solutions.

The logo for Akustec, featuring the word "AKUSTEC" in a stylized, handwritten font. The letters are black with a light blue shadow effect, and a dashed blue line arches over the top of the letters.

History

Mr. Wolfgang Metzen was trained as a mechanical engineer, and initially worked in an engineering office where he specialised in the noise and vibration of machines and engines. The Akustec consultancy company was started in 1990.

The foundation for the strong relationship which exists today between Akustec and Brüel & Kjær began in 1993 with the first joint project in building acoustics. Using his automotive and NVH experience, Mr. Metzen has worked extensively in this industry, not only in Germany but in many other European countries, USA, Africa, Middle East, etc.

Mr. Metzen states, "My goal is to provide effective and efficient NVH test solutions for our customers. Although Akustec provides consultancy in a number of areas, we work only with Brüel & Kjær in acoustics and vibration". He continues, "I want to be a partner with the world-market leader and I like to have confidence in recommending their solutions to our customers".



Akustec is at the cutting edge of automotive industry technology, including work with Formula One car racing.

Satisfying Customer Needs

What factors influence a customer in choosing Akustec to deliver a solution? Akustec's large knowledge of acoustics, vibration, signal analysis and engineering within the automotive industry, are major factors and the reference list is impressive.

Mr. Metzen says, “Customers have a deep knowledge of the tasks that need to be satisfied. The business is market driven and our aim is to provide customised PULSE solutions which are developed to fulfil the customer’s requirements. We can offer “one-off” customisation, using PULSE hardware and software, and give the customer the interface and functionality which he needs.” He continues, “Based on my experience, I can summarise the main automotive customer requirements as follows:

- Implementation of PULSE into automotive test cells – the PULSE multi-analyzer platform is highly regarded in the automotive industry. The accuracy of the measurements is never an issue
- Data and Data Handling – the quality and reliability of test data is a vital factor, especially with increasing NVH demands and pressure to reduce costs and development time
- Network Integration – companies must be able to make test data and reports freely available to many departments, including sites in different countries
- One-stop shopping – I really like the benefits and advantages of being able to get everything from one source. Brüel & Kjær supplies most of the hardware we need, from transducers and cables through to the analyzers. And the large number of automotive applications which run under PULSE is very complete”.

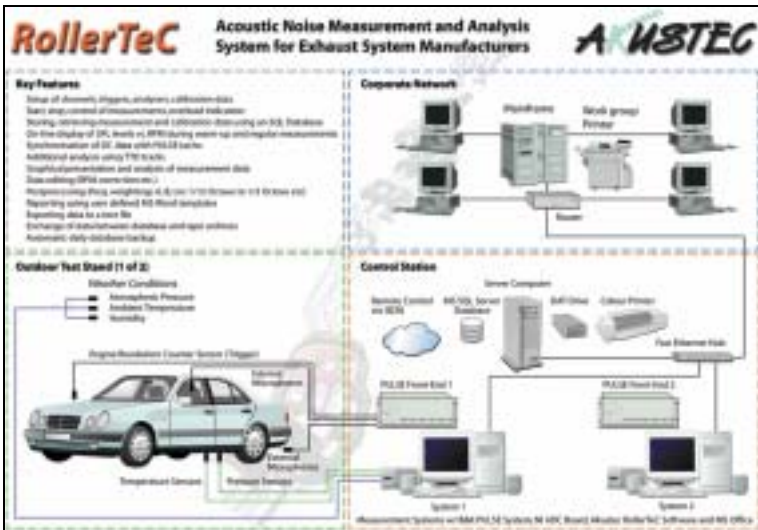
PULSE

Mr. Metzen says, “I have worked with PULSE since Brüel & Kjær first introduced it in 1996. In my opinion it is the number one multi-analyzer platform. PULSE is an open system and the fact that is modular and scalable makes it very attractive to customers as they can easily expand their PULSE system as their test and analysis needs grow.

PULSE is also native NT and, as the processing is all performed by the PC, we can take advantage of the rapid development of computer processing speeds. Therefore, the speed of analysis tasks using PULSE increases too, so I can assure my customers that PULSE is a safe future investment.”

Test Cell Solutions

*Fig. 1
Overview of the Akustec RollerTec system used at Eberspächer*



Akustec has specialised in NVH test solutions in the automotive industry. In discussions with customers, the initial considerations include the collection of data, required types of analysis, database storage/retrieval and the way in which the data is to be used. This may result in the creation of written reports or a production line QC function with pass/fail indications of product conformity.

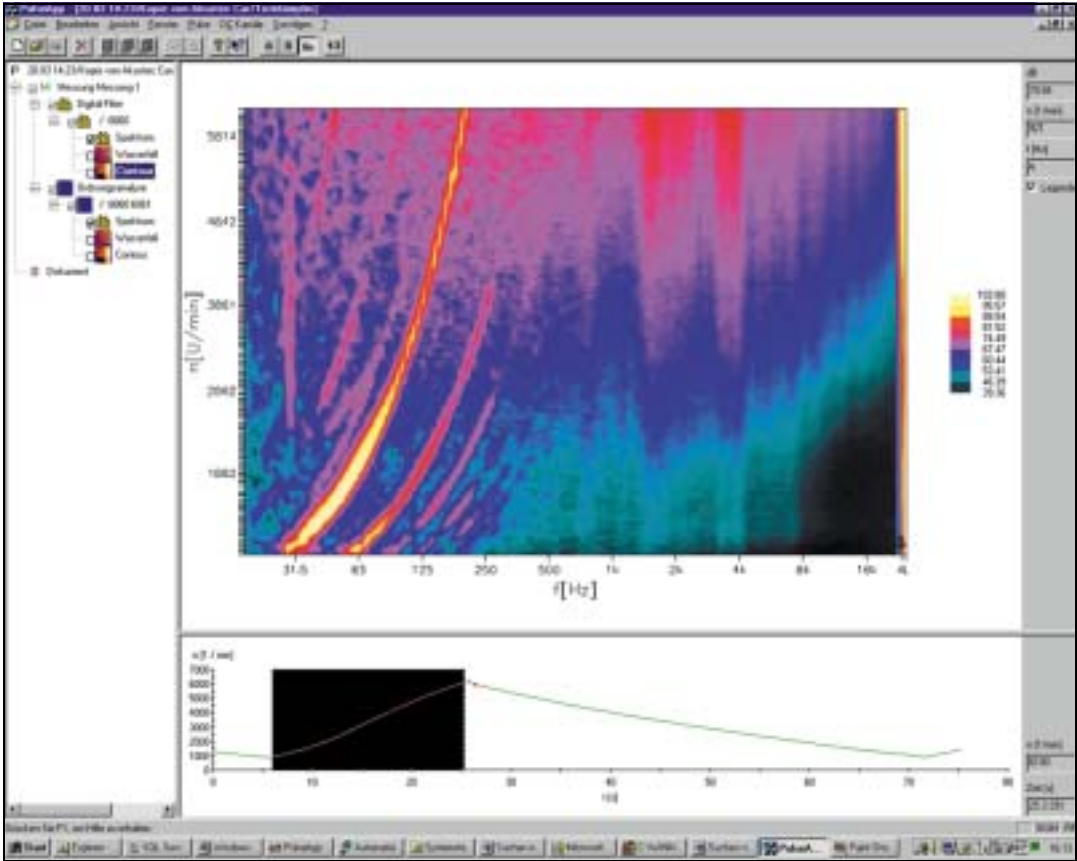
Here are some examples of solutions that have been developed by Akustec, based on Brüel & Kjær's PULSE platform.

Eberspächer

Located at Esslingen, Germany, Eberspächer is a very large OEM supplier of exhaust systems to major automotive manufactures throughout the world. As a market leader, Eberspächer attaches great importance to product quality and PULSE is widely used in the design and development of exhaust systems for new vehicles. Working closely with the vehicle manufacturer, Eberspächer aims to optimise the NVH characteristics of its products.

One of the special demands for Eberspächer's customised solution was the management of data on a central database server on their network. This enable data from all over the world to be retrieved and this facility has become increasingly important as Eberspächer established new branch offices in the USA and France.

*Fig. 2
A typical display from the customised PULSE software used at Eberspächer*



Pirelli

*Fig. 3
Akustec developed the ARTI user interface for PULSE at Pirelli*



The name Pirelli is synonymous with the manufacture of high quality tyres. Pirelli in Germany, in cooperation with their colleagues in Italy, asked Akustec to develop a user interface for use with their Brüel & Kjær PULSE multi-analyzers.

In an acoustic test cell, the noise from a tyre is recorded in relation to speed. FFT spectra and order analysis are made on each channel. Akustec's ARTI software controls the Brüel & Kjær PULSE LabShop system, performs the measurements, displays the results, and stores and retrieves the data to or from a Microsoft SQL

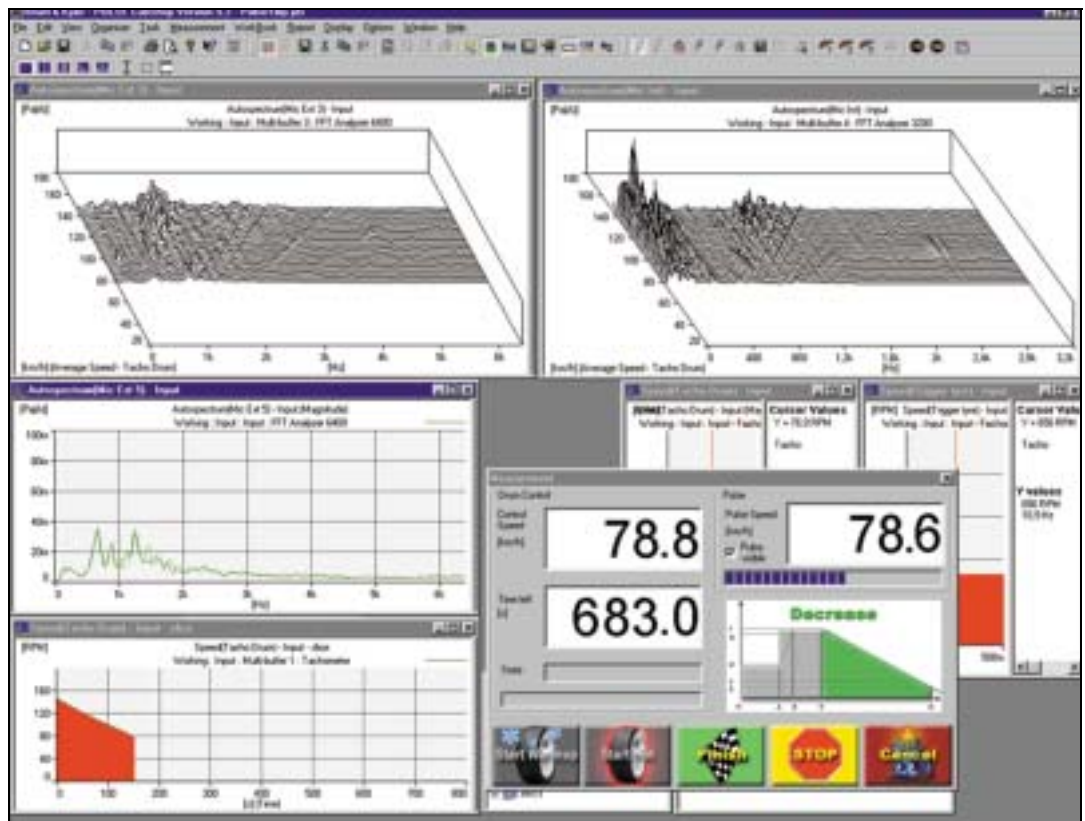
database server. The software can also export the measurement results as ASCII data. There is also a facility to archive and retrieve the data to and from a tape streamer.

Fig. 4
An anechoic test cell at Pirelli



At a later stage, it is planned to access the data from the database via a web browser. Therefore, the server software must be able to produce dynamic HTML output to correctly display the required data. An ActiveX control should be used for the graphical representation of the data.

Fig. 5
Pirelli - PULSE multispectra display showing the Akustec user interface window



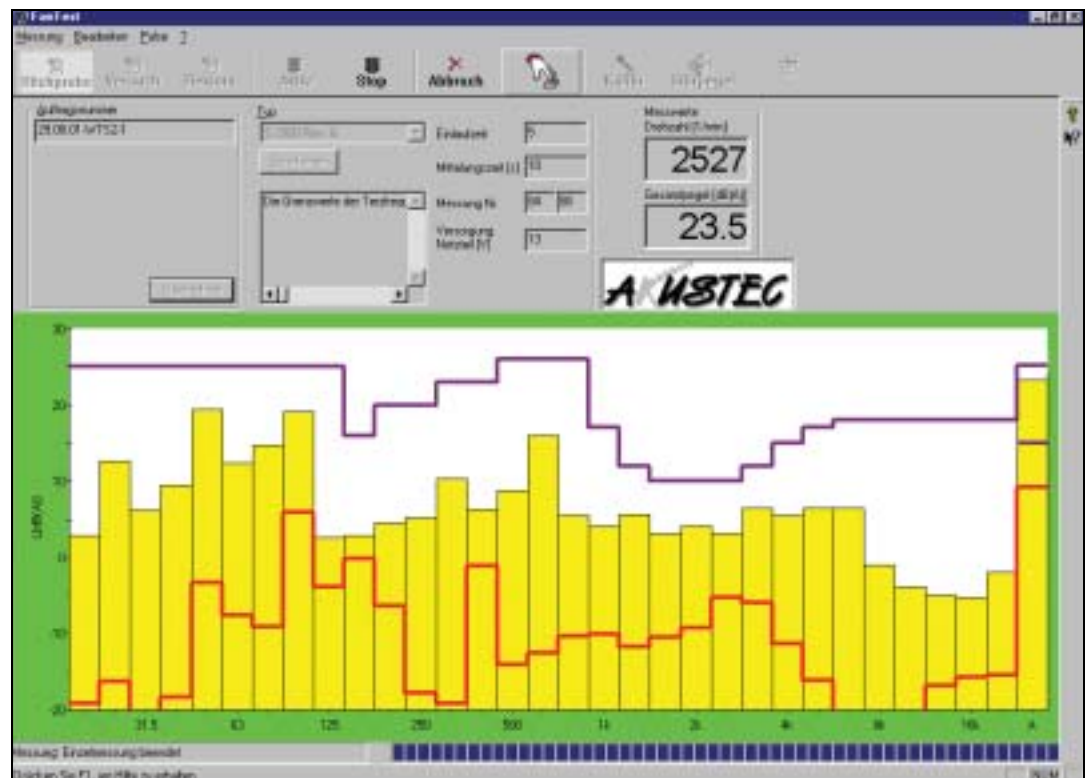
Papst

Based at St. Georgen in Germany, Papst is an automotive sub-supplier specialising in the manufacturer of sensor fans for vehicle air conditioning equipment. Papst uses its PULSE system to analyse sound quality. A number of samples are taken from the production line and are thoroughly tested. The objective is to fulfil customer demands on quality assurance concerning the acoustical noise of the products. The sound power of the products is very low and one of the tasks is to ensure that environmental noise does not affect the measurement results.

Akustec has developed an operator interface that is so easy to use that even semi-skilled operators are able to perform the sound quality test and record whether a fan passes or fails the required specification. In fact, the measurements are made using just three push-buttons. A database is used to document the results and to analyse statistics.

Each product has a set of 1/3-octave limit levels which is also stored in the database and shown on the display while the measurement takes place. The influence of the ambient noise is also displayed during the measurements. The system controls the fan's power supply and monitors whether the fan speed remains within specified limits.

*Fig. 6
Papst – an example
of the operator
display in the
customised PULSE
program*



Open Platform – The Benefits

COM/OLE Interfaces

Mr. Metzen continues, “PULSE is open platform. It is easy to control the functions from other programmes through the COM/OLE interfaces. The benefits from this tight integration include:

- Graphically – the total solution is seen on the screen as one programme
- Speed – up to 100% faster through the use of ActiveX™
- Applications framework – many of the tools we need are already available in PULSE™

The Future

“My relationship with Brüel & Kjær has been very successful, over many years, says Mr. Metzen. He concludes, “I am very pleased to be a member of the new PULSE Solution Network and, in my opinion, the creation of this “community” with such a vast knowledge-base will be a great benefit to everyone”.

Key Facts

- Akustec is an independent consultancy company founded in 1990 and located near Munster, Germany
- Mr. Metzen is at the cutting edge of automotive industry technology and works with Formula One racing teams
- Akustec has worked with Brüel & Kjær since 1993 and is a member of the PULSE Solution Network
- Akustec specialises in sound and vibration testing and measurement in the automotive industry
- The company has purchased and recommended the PULSE platform since it was first introduced in 1996
- Akustec develops and implements customised PULSE solutions and has worked for many world-leaders in the automotive industry
- Akustec works exclusively with Brüel & Kjær in acoustics and vibration
- Mr. Metzen states that PULSE is the world's number one analyzer platform

TRADEMARKS

ActiveX™ is a trademark of Microsoft Corporation in the United States and/or other countries