Federal Ministry
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ZIM
Zentrales
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Mittelstand

# ZIM Success Story

Central Innovation Programme for SMEs

Cooperation Projects 143

## Fine-Tuned Acoustics

**New software suites offer numerous ways to optimize the modeling, arrangement, and control of line-array sound systems deployed at major events. Software enables numerical optimization of mechanical configurations and acoustic radiation, making it possible to attain the highest possible quality across consistent sound fields.**

Today's younger generation is hardly the first to consider pulsating open-air concerts a key element of a memorable summer. Back in August 1969, half a million fans flocked to Woodstock to see the likes of Jefferson Airplane, Jimi Hendrix, the Grateful Dead, The Who, Janis Joplin, and Crosby, Stills, Nash & Young. An outdoor location can turn any concert into a can't-miss event, from Electric Daisy Carnival in Las Vegas to Tomorrowland in Belgium. A myriad of recent advancements in sound technology and related instruments have opened the door to significant increases in sound quality at outdoor venues.

### Product and innovation

Today, high-quality loudspeaker systems, such as line arrays, are used at virtually every large concert. The digital signal processors in this kind of sound equipment enable sound engineers to configure sound emission characteristics with a high degree of flexibility and precision, using both mechanical and software-based techniques. Thus, DSPs enable loudspeakers to produce consistent sound fields of exceptional acoustic quality for a wide range of applications and event locations.

Project partners PK (Canada) and SDA (Germany) have developed several new software solutions for sound reproduction technologies. These solutions primarily include end-user software applications that support the configuration and optimal control of sound systems designed to work with outdoor loudspeaker arrays, particularly those manufactured by PK. This software relies on various basis modules developed by SDA that can also serve as a foundation for a manufacturer-independent simulation platform with enhanced analytical tools for spatial acoustics.

The essential technical functions of the software include:

- Simple entry of system data and venue geometry specifications
- Precise calculation and practical illustration of key performance data (such as delay and frequency response) on highly sophisticated line-array systems
- Prediction of physiological parameters like clarity and articulation based on simulated physical sound-field dimensions
- Numerical optimization of system configurations (angle and filter settings, for example) and subsequent transfer of control parameters to the processors of the line array system at hand

IuK-Technologies

Fig. 1: Line-Array, PK Event Services Inc.

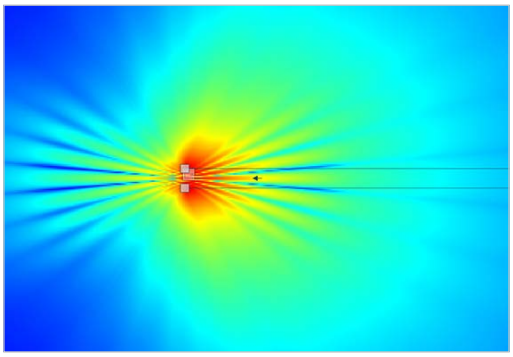

Fig. 2: Gradual coherency loss of two acoustic sources with increasing distance

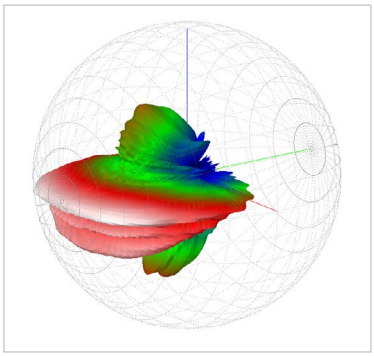

Fig. 3: 3D-directivity of a curved PK Trinity Line Array with 8 elements

Among other features, these new software packages cover a range of individual factors, such as the emission characteristics of loudspeaker arrays, their arrangement and directional positioning, and environmental parameters related to absorption, coherence, reflection, and diffraction (including temperature gradients).

The combination of corresponding measurements and an integrated user interface facilitates optimal line-array control, which in turn enables sound engineers to attain much higher sound quality in less time

## Market and customers

PK's established position throughout North America and SDA's own reputation in international markets will give these two companies wide-ranging opportunities to sell their software products.

In particular, their potential customers will include planning agencies that deal with fixed installations, sound engineers specializing in mobile event technology, and manufacturers of loudspeaker systems. PK is planning to launch its line array software in April 2017, while SDA's own manufacturer-independent software is expected to hit the market in mid-2018.

## Collaboration partners

Founded in 2001, Berlin's SDA (Software Design Ahnert) GmbH develops and sells software for sound, lighting, and other event-related technical applications. The firm's 20 employees market its systems in cooperation with the distribution company AFMG.

PK Event Services Inc. of Calgary (Alberta), Canada, has 26 employees engaged in the development and production of professional loudspeaker systems designed for concerts, theaters, festivals, stadiums, and other venues. Along with its expertise in sound installations, the company offers a comprehensive portfolio of audio, video, and theatre services that cover everything from planning to performance.

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The Central Innovation Programme for SMEs (ZIM) provides support for promising technologies and industries in a number of arrangements:

- Individual projects
- Cooperation projects
- Cooperation networks

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