# FLEXIBLE ELECTRONICS IN SPORTS AND HEALTH – ACOUSTIC GAIT ANALYSIS

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## INTRODUCTION

Flexible electronics allow for the manufacturing of smart sensor-devices which are comfortable to wear and measure various bio-signals. The data can be transferred to a PC or smartphone and be processed with software.

## ACOUSTIC GAIT ANALYSIS

- Target: Correction and optimization of gait and run movement for injury prevention, rehabilitation and leisure sports.
- Measuring the plantar pressure distribution by a flexible / stretchable shoe inlay with integrated electronics and the ISIT bendable Li polymer secondary cell.
- Data transmission to PC / smartphone by WLAN.
- Acoustic and graphic bio-feedback.

## MILESTONES AND PROTOTYPES

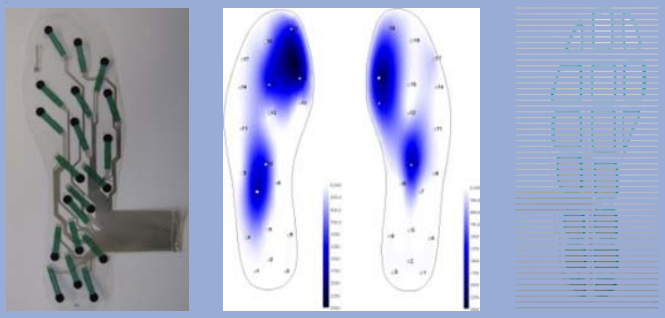
Two inlay prototypes are planned:

- 1) After 6 months: Cable-based, bendable pressure sensor inlay with discrete periphery, simple data management and analysis, WLAN data transfer.
- 2) After 3 years: Autonomous, flexible force sensor inlay together with functional layer containing electronics, Bluetooth™, ISIT secondary cell.

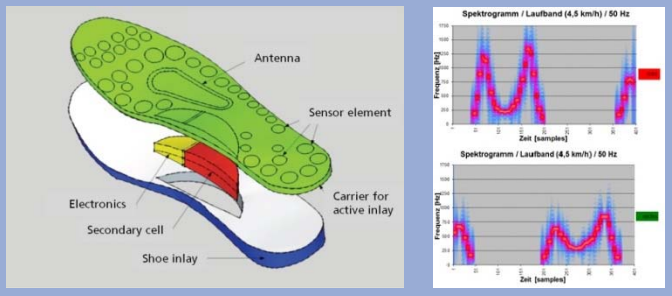
There will be two versions of the final product:

- A) For private use, affordable by private persons;
- B) For professional use under medical observation, e.g. disease treatment after injuries or serious illness.

## RESULTS



**First inlay prototype: Left: Flexible, cable based inlay with inkjet printed tracks and assembled foil force sensors. Center: Plantar pressure distribution (ball standing). Right: Screen and stencil printed capacitive sensors.**




**Left: Schematic of second autonomous sensor inlay. Right: Gait measurement curves converted to sound signals.**

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