

## **Mobile monitoring of brain and heart functions for neuro-feedback applications**

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### **Purpose**

With this abstract a new device (g.MOBilab) for mobile monitoring of brain and heart functions is introduced. The device, based on a personal digital assistant (PDA), allows to display and store multimodal biosignals (EEG, ECG, EMG or EOG) along with sensor signals (pulse, respiration, ...). Biofeedback modules enable to present experimental paradigms and to feed back relevant data features. A field study in healthy man proofed the robustness and applicability of the device.

### **Methods**

A total of 20 subjects participated in a field experiment on the Dachstein glacier. The effects of the fast ascent with the cable car (from 1700 -2700 m) on EEG and ECG was investigated. The subject performed a reaction time experiment. A green or red light was switched on randomly. A total of 60 trials was recorded. Only if the green light was switched on, the subject had to press a button as fast as possible. 2 EEG channels from electrode positions C3 and C4 and one ECG channel (Einthoven I) were recorded.

### **Results**

Mean heart-rate increased from 69,72 to 82,47 beats per minute; mean heart rate variability decreased and the mean power ratio of low frequency to high frequency components in the heart rate increased. The mean reaction time increased by about 34 ms and the mean relative band power ratios in the alpha and beta band increased by about 20% and 90 %.

### **Conclusions**

The presented results in this paper show that g.MOBilab facilitates the application of experimental paradigms yielding reliable results also under difficult field conditions.