Czech National Node for Neuroinformatics (CNNN) http://www.cnnn.cz/

NODE IN NUMBERS

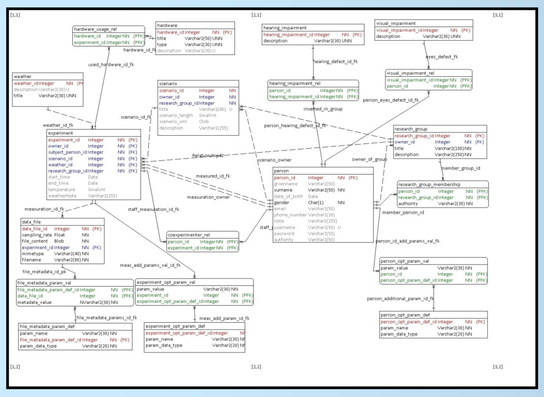
- ✓ 11 research partners in the Czech Republic (universities, research institutions, industrial enterprises)
- ✓ 60 people involved
- ✓ 4 significant domestic projects and research grants

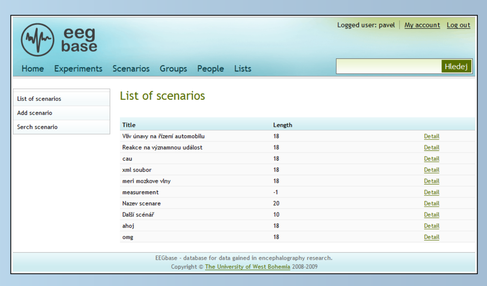
PROJECTS

- ✓ Human interactions with transportation vehicles
- ✓ Drivers' behavior – head muscles tension
- ✓ Database of drivers' records – 12 specialized parts, data from 650 people
- ✓ Driving simulators
- ✓ EEG/ ERP experimental database
- ✓ ERP analysis in children with developmental coordination disorder
- ✓ Methods of EEG/ERP analysis

EEG/ERP DATABASE

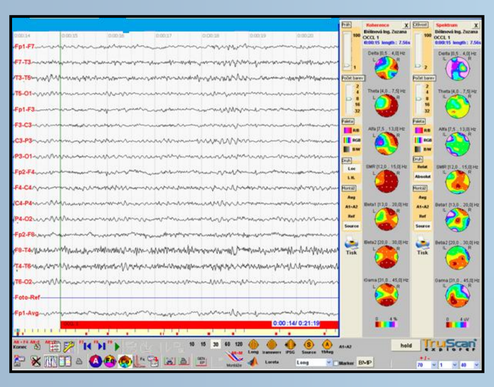
- ✓ Storage, update, and download of EEG/ERP data, metadata, experimental design (experimental scenarios), and testing subjects
- ✓ Authentication, authorization, user rights
- ✓ OR mapping, relational database, Hibernate, Java, Spring MVC
- ✓ Mapping to semantic web language - RDF/XML
  - ❖ From object oriented code – D2RQ, Jena
  - ❖ From relational database – Jenabean

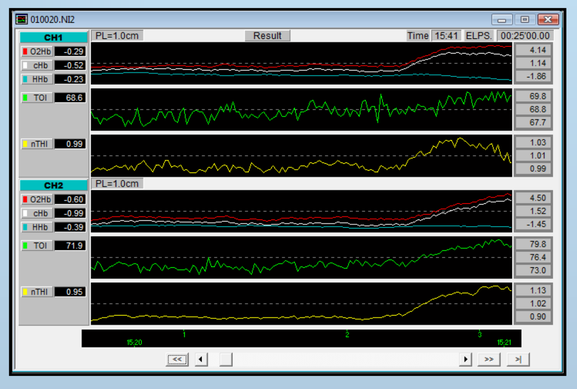




HUMAN INTERACTION WITH TRANSPORTATION VEHICLES

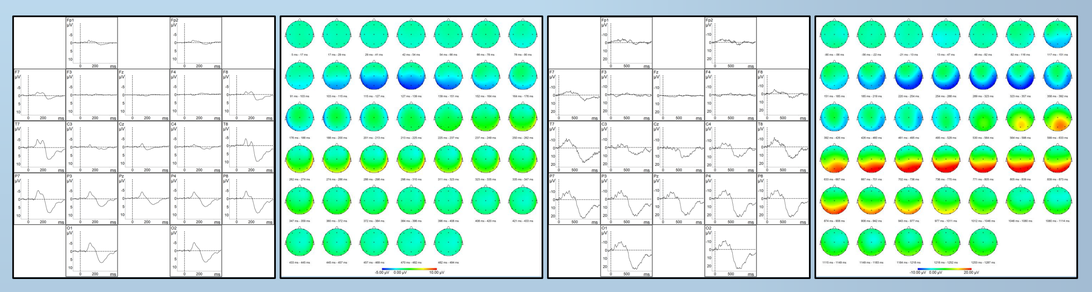
- ✓ Parallel detection of EEG activity and near infrared spectroscopy (NIRS) under various physiological and psychological conditions
- ✓ More than 40 testing subjects
- ✓ Analysis of drivers' behavior (tolerant vs. aggressive)
- ✓ Training of drivers –> higher resistance to attention decrease and non tolerant driving – bio-feedback





ERP ANALYSIS IN CHILDREN WITH...

- ✓ …developmental disorders in the coordination
- ✓ Relation between motor activity and brain response
- ✓ Visual, auditory and cognitive ERPs (MMN, P300)
- ✓ Dysfunction of the complex signals differentiation – variance of latency and amplitude of ERPs



DRIVING SIMULATORS

- ✓ Mladá Boleslav, Prague, Brno, Pilsen
- ✓ Different approaches, e.g.
  - ❖ Prague – real cars, wide screens, continuous EEG recording
  - ❖ Pilsen – simulation software, ERP recording, precious synchronization

METHODS OF EEG/ERP ANALYSIS

- ✓ Modification, implementation and testing of
  - ❖ Matching pursuit algorithm
  - ❖ Wavelet transform
  - ❖ Huang-Hilbert transform