móvil
smart navigation
www.movil-nav.de

project „movil“
idea and basic concepts

Burghard Bolle, Maximilian Heller, Alexander Wollmann, Sandor Paoli

supervised by Prof. Dr. Michael C. Wilhelm

WS 2008/2009 – Hochschule Karlsruhe

contents of presentation

Hochschule Karlsruhe
Technik und Wirtschaft
UNIVERSITY OF APPLIED SCIENCES

móvil
smart navigation
www.movil-nav.de

- idea
- job definition
- basic concept (assembly)
- mechanical subtasks
- electronical subtasks
- objectives
- future prospects

idea

Hochschule Karlsruhe Technik und Wirtschaft
UNIVERSITY OF APPLIED SCIENCES

movil smart navigation
www.movil-nav.de

modular integration of various different technologies into a double-DIN car head unit

- versatile protocols
- various applications
- standartised components
- widely available
- cost efficient
- flexible
- easily upgradeable

idea

Hochschule Karlsruhe
Technik und Wirtschaft
UNIVERSITY OF APPLIED SCIENCES

móvil
smart navigation
www.movil-nav.de

- **standard functions**
  - radio, handsfree, music player, traffic data via RDS

idea

Hochschule Karlsruhe Technik und Wirtschaft
UNIVERSITY OF APPLIED SCIENCES

móvil smart navigation
www.movil-nav.de

Additional possible innovative functions

- **modern communication**
  - voice communication via Skype, Voice over IP
  - voice controlled instant messaging like ICQ or MSN
- **entertainment und infotainmentfunctions**
  - audio playback, streaming, audiobooks, etc.
  - video playback
  - internet
- **acquisition of vehicle and environmental data**
  - fault code memory, recommendation to visit workshop, electronic economic driving lesson, etc.
  - extended onboard computer functions, calculation of CO2-emmissions,engine power, energy throughput, efficiency
  - Useable as vehicle tracker for fleet management purposes
- **driver assistant systems can be realised in software with cheap hardware**
  - rain sensing and ambient light sensing by the use of simple camera and image processing software.
  - anti-slip-warning by use of vehicle and sensor data via CAN or special hardware (dymolog project)
  - distance control and reversing assistant with simple camera and image processing software.

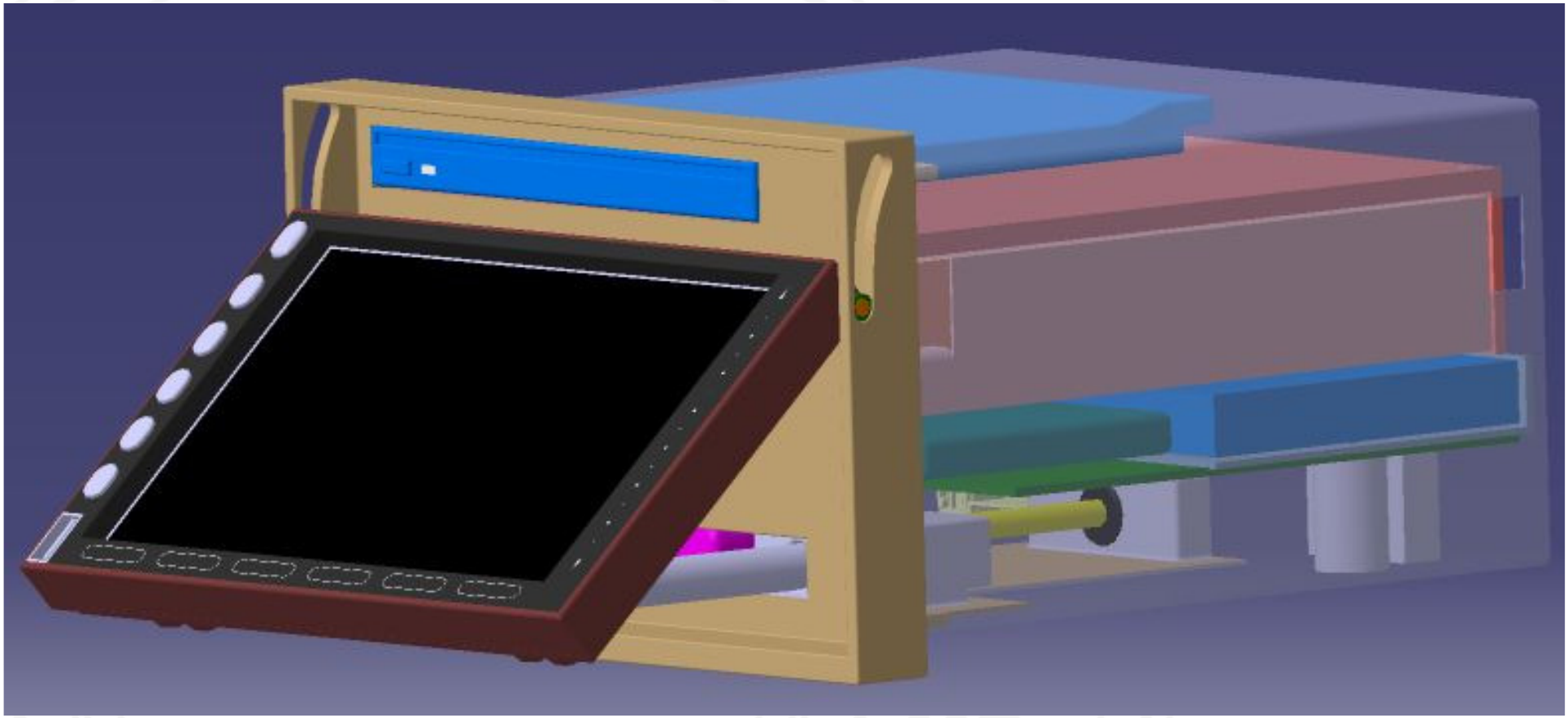
objectives

- **A modular, upgradeable device shall be developed which can be operated in a standard double DIN car radio bay.**
- **The device is used as hardware basis for a higher operating system like linux or windows xp.**
- **The user can operate the device using the integrated touchscreen, some function keys and a dedicated capacitive slider area.**

basic concept (assembly)

Hochschule Karlsruhe
Technik und Wirtschaft
UNIVERSITY OF APPLIED SCIENCES

móvil
smart navigation
www.movil-nav.de

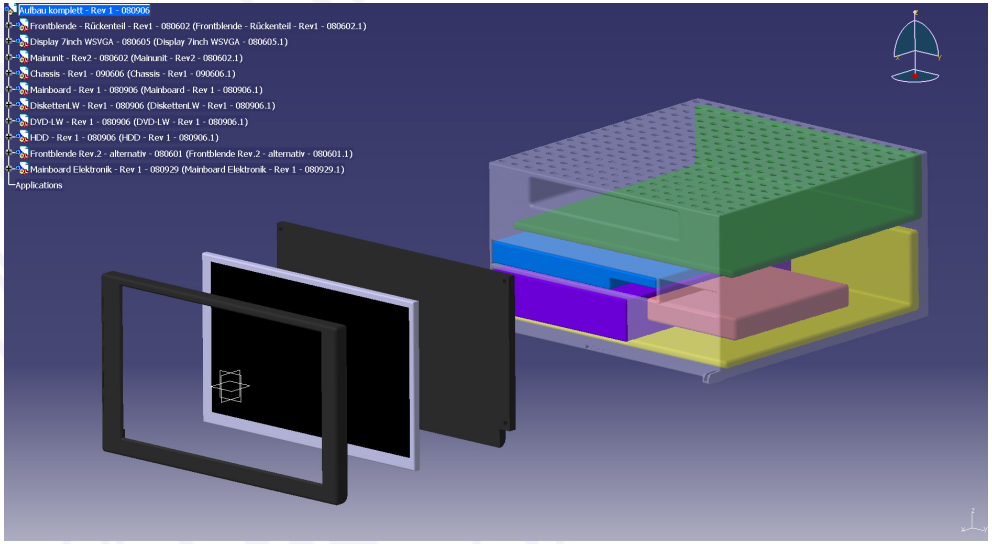


Mechanical subtasks

Hochschule Karlsruhe
Technik und Wirtschaft
UNIVERSITY OF APPLIED SCIENCES

móvil
smart navigation
www.movil-nav.de

- **plastic parts**
  - design
  - prototyping
    - milling plastic blocks
    - painting
    - engraving
- **metal framework**
  - design
  - prototyping
    - cutting
    - folding and creasing
    - assembly



electronics subtasks

- **adaptation of LVDS display to mainboard**
  - twisted pair cable and FFC / adaptation pcb
- **PCBs for display frame**
  - left side: pusher switches
  - right side: slider area
- **main power and control board with µc**
  - planning, layout and production
  - upgradeable
- **programming of µc**
- **adaptation of slider and touchscreen as HID-devices**

main objectives (musts)

- hardware with runable OS (Linux, Win)
- power supply via ISO10487 jack
- audio amp running
- touchscreen, keys and slider running
- navigation software runable
- Working double-tuner FM radio module

→ **ideal hardware-basis for future software projects**

Future prospects

Hochschule Karlsruhe
Technik und Wirtschaft
UNIVERSITY OF APPLIED SCIENCES

móvil
smart navigation
www.movil-nav.de

- **Computer is (with slight modifications) also useable outside of vehicles as**
  - **industrial control pc (e.g. using Labview), SPS-replacement**
  - **computer cash desk**

- **Software-development is also possible with open-source community. In contrast to hardware development, software development can easily be done at home.**
- **Continuation of project is possible as internship or diploma thesis with external partners.**

- **Thank you for your attention !**
- **Feel free to ask us questions about our project**

móvil
smart navigation
www.movil-nav.de

Contact us @:

team@movil-nav.de

sandor.paoli@movil-nav.de