Livingstone by SAVAS

SAVAS public transport Quality Seating

The development of the first electrically powered operator seat for public transport.

- speaker: Frans-jozef van Seumeren (owner)
- company introduction

  SAVAS | Public Transport | Seating

- development Livingstone | from idea to seat

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company introduction SAVAS | public transport |Seating

- short history
- activities
- products
- processes
- customers

short history

- family owned company
- selling (industrial) seats since 1962
- head office in the Netherlands
- branches in NL, Germany, Belgium and France
- in public transport since 1993

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activities

SAVAS:

- develops, manufactures and supplies ergonomic driver seats for all vehicles.
- provides spare parts for all brands of seats
- provides service facilities in many places in the Benelux and on location

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products | driver seats for:

- **public transport**
  bus-tram-train-metro
- **industry**
  forklift truck-cranes
- **transport**
  lorries-vans-cars-ships






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processes

- **projects**
  - new seat development
- **production**
  - custom made
  - modular adjustment
  - individual
  - serial
- **service & repair**
- **trade**

customers | public transport

- End Users
- Original Equipment Manufacturer (OEM)

customers | end users

Rail

- NS (Dutch Railw.)
- Railion
- Syntus
- Connexxion
- Shunter - cargo
- Lituanian rail - cargo
- SNCF – TGV
- DB
- Arriva

Rail

- SBB
- MVG Mainz
- SWK Krefeld
- NMBS – SNCB BE
- MIVB – STIB Brussels
- NCFL Luxembourg
- De Lijn
- TEC

Tram

- Connexxion
- GVB (Amsterdam)
- HTM (the Hague)
- RET (Rotterdam)
- Athens Tramways Comp
- De Lijn – Antw. – Oostende
- Stadtwerke Dortmund
- EVAG Essen
- NVS Schwerin
- KVB Köln

customers | end users

Metro

- RET (Rotterdam)
- GVB (Amsterdam)
- SNCF(Paris)
- Munich U-Bahn
- BVG Berlin

Bus

- Veolia
- BBA Connex Group
- Connexxion
- GVB (Amsterdam)
- GVU (Utrecht)
- Hermes
- RET (Rotterdam)
- Arriva
- De Lijn
- MIVB - STIB

customers | OEM

- Alstom La Rochelle
- Alstom Valenciennes
- Alstom Salzgitter
- AnsaldoBreda
- Bombardier Bautzen
- Bombardier Bruges
- Bombardier Aachen
- Siemens Krefeld
- Alexander
- APTS (Philias project)
- Stadler
- Vossloh
- VDL Group
- Evobus
- Van Hool
- MAN
- Siemens
- Wrightbus
- Volvo
- Caetano Portugal
- Socofer
- Scania
- Hess

development Livingstone | from idea to seat

- initial idea (2005)
- brainstorm (2006)
- mock up (2007)
- alfa 0.1 (2009)
- bêta 0.1 (2010)
- bêta 0.2 (2011)
- operation control

initial idea

- requests out of the market
- seat doesn't exist for public transport
  - common in private cars
  - big seating companies don't develop
- niche product for SAVAS
  - own seating line
- creating benefits for the market

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initial idea | benefits (1)

- seat layout designed for up to 98 ‰ of driver population
- full memory function
- initial seat set up the same for all vehicles
- optimalisation driving schedule
- increasing comfort for passengers
- saving time & money > ROI

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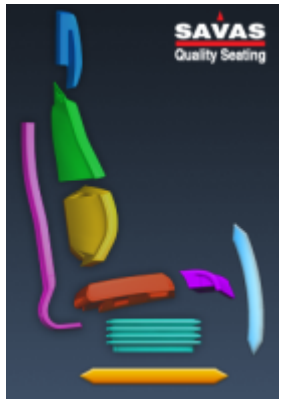
initial idea | benefits - saving time

- ROI
- saving time:

starting up time for: seat, coat, bag, steering wheel, personal code, mirrors etc



initial idea | benefits – saving money

- ROI
- saving money

  f.e. 2 minutes each shift: 6 x 2 min.= 12 min per day

  7 x 12 min. = 84 min. per week

  = 336 min per month

  = 5,6 hrs per month à € 35,-

  = saving € 196,- per month per unit

initial idea | benefits (2)

- decreasing employers responsability
- healthy & safe
- comfort: ergonomics & vibrations
- according to latest EU laws for rail and road vehicles / norms
- responding to future trends like:
  - new vehicles - machines
  - state of the art design
  - new technical capabilities

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brainstorm 2006 | partners

enthoven associates *design consultants*

Gerritsen

Sterk in Engineering!

DISIGN CONSULTANTS

David Blackmore
independent engineer

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► brainstorm 2006 | mock up specs (1)

- for population P1 small woman - P99 big man (Dutch population)
- lifting capacity up to 200 kg

- seat with grow concept!

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► brainstorm 2006 | mock up specs (2)

- memory function
- electrical adjustments
- optimal safe use
  (law & norms)
- state of the art

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► brainstorm | mock up specs (3)

- ► suitable for men & women
- ► modern & sexy looks
- ► easy to maintain
- ► suitable for every application

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► **brainstorm** | **mock up specs (4)**

- no backframe but ‘spine’
- according to M1 vehicle class
  with integrated seatbelt
- multi functional headrest →

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- **mock up** | **marketing**

- introduction Busworld 2007 & Innotrans 2008
- interest
- getting feed back on the design

mock up | improvement points

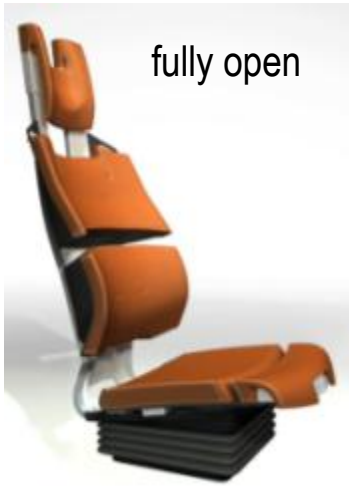
- concession on design in regards to concept
- back curve
- possible unsafe parts
- unknown seating comfort

alfa 0.1 | studies P 98 (1)

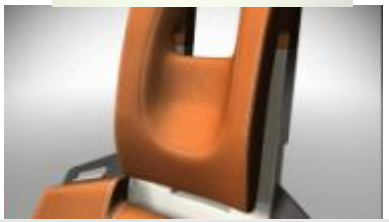
closed

half open

fully open



back & side



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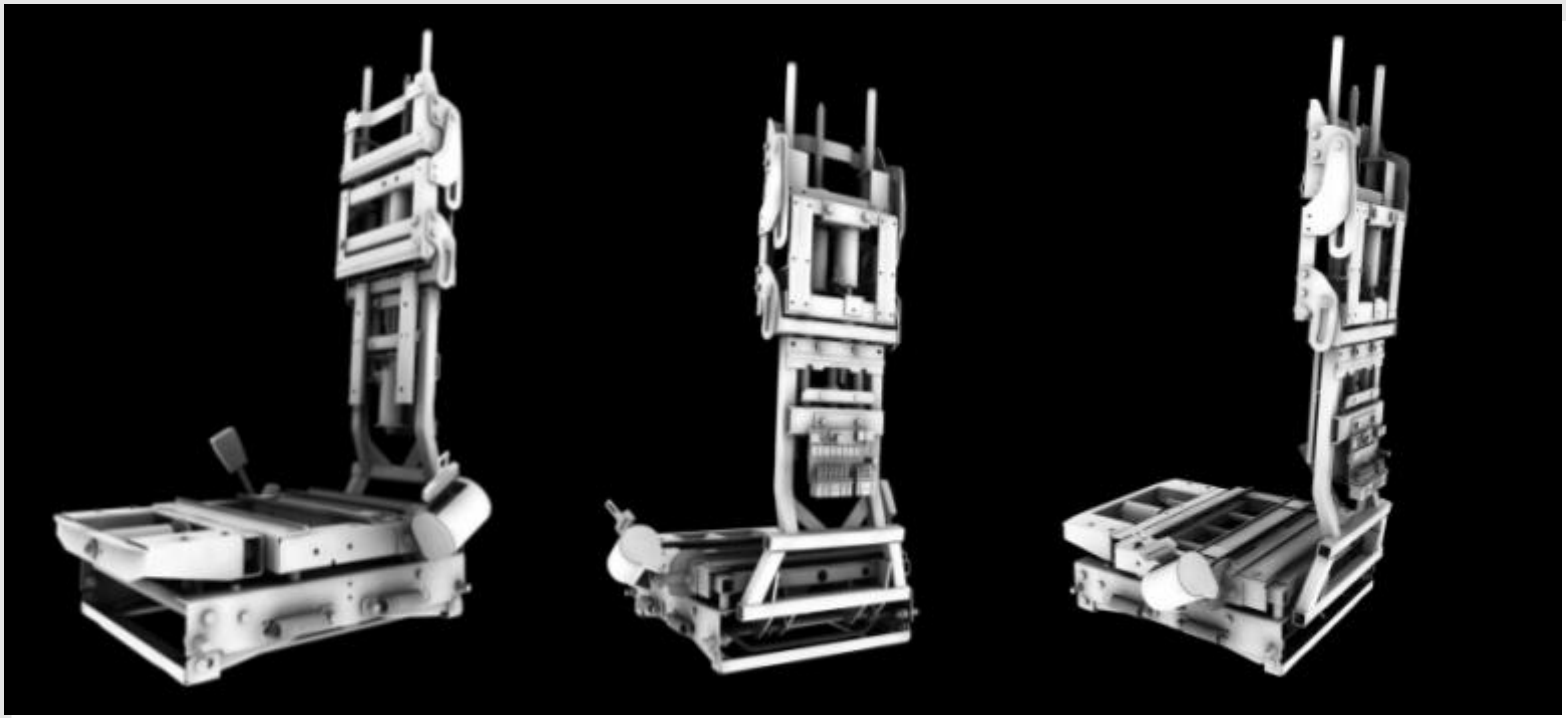
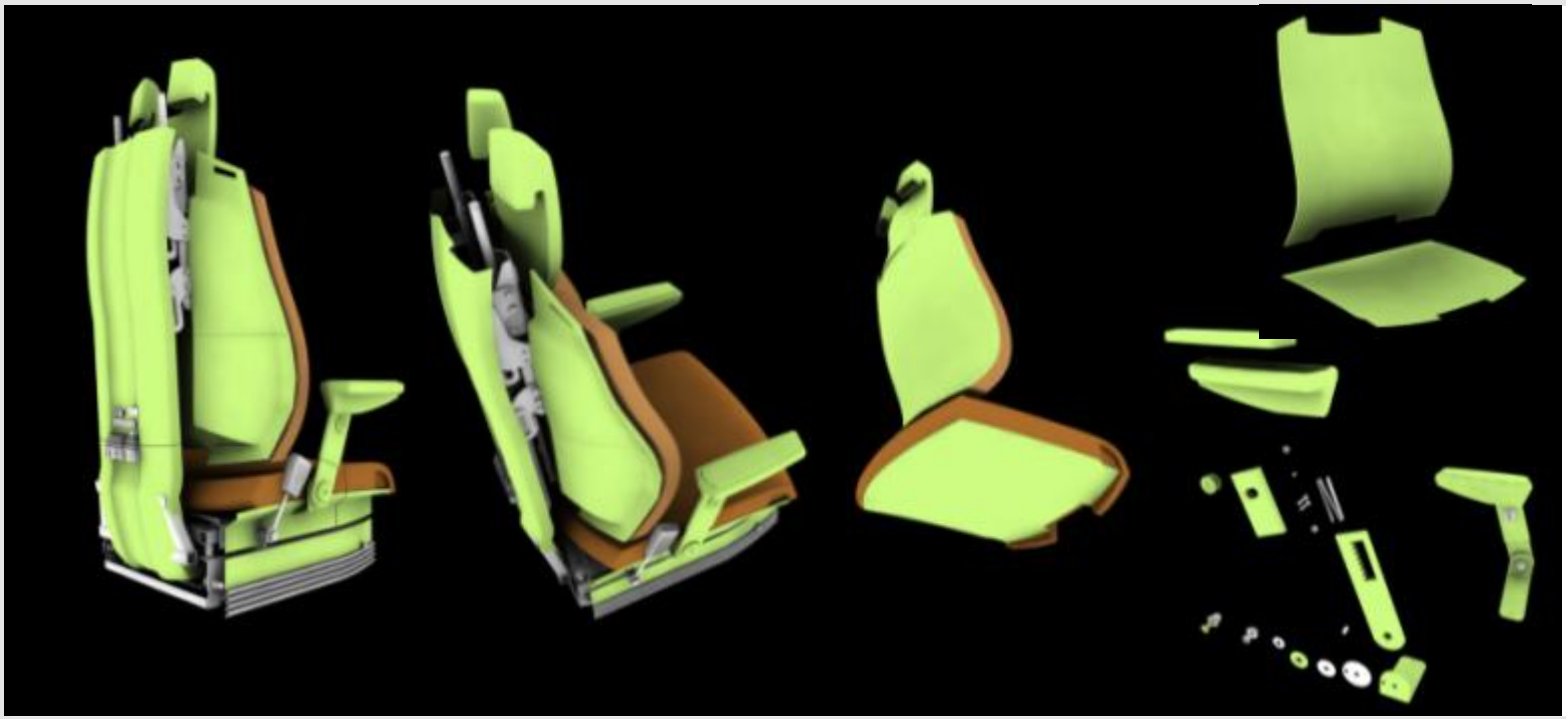
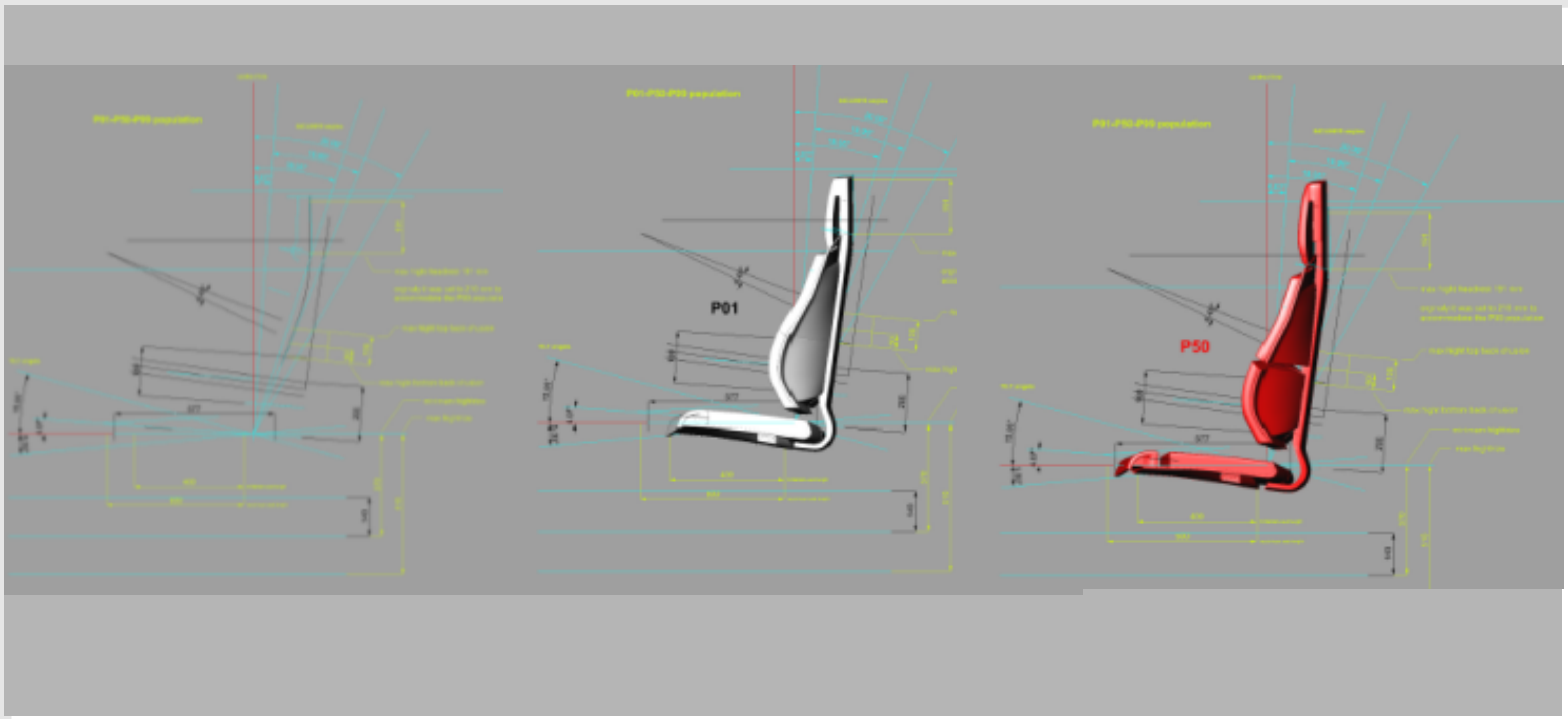
alfa 0.1 | studies P98 (2)



alfa 0.1 | studies P98 (3)



alfa 0.1 | dimensions P98 (1)



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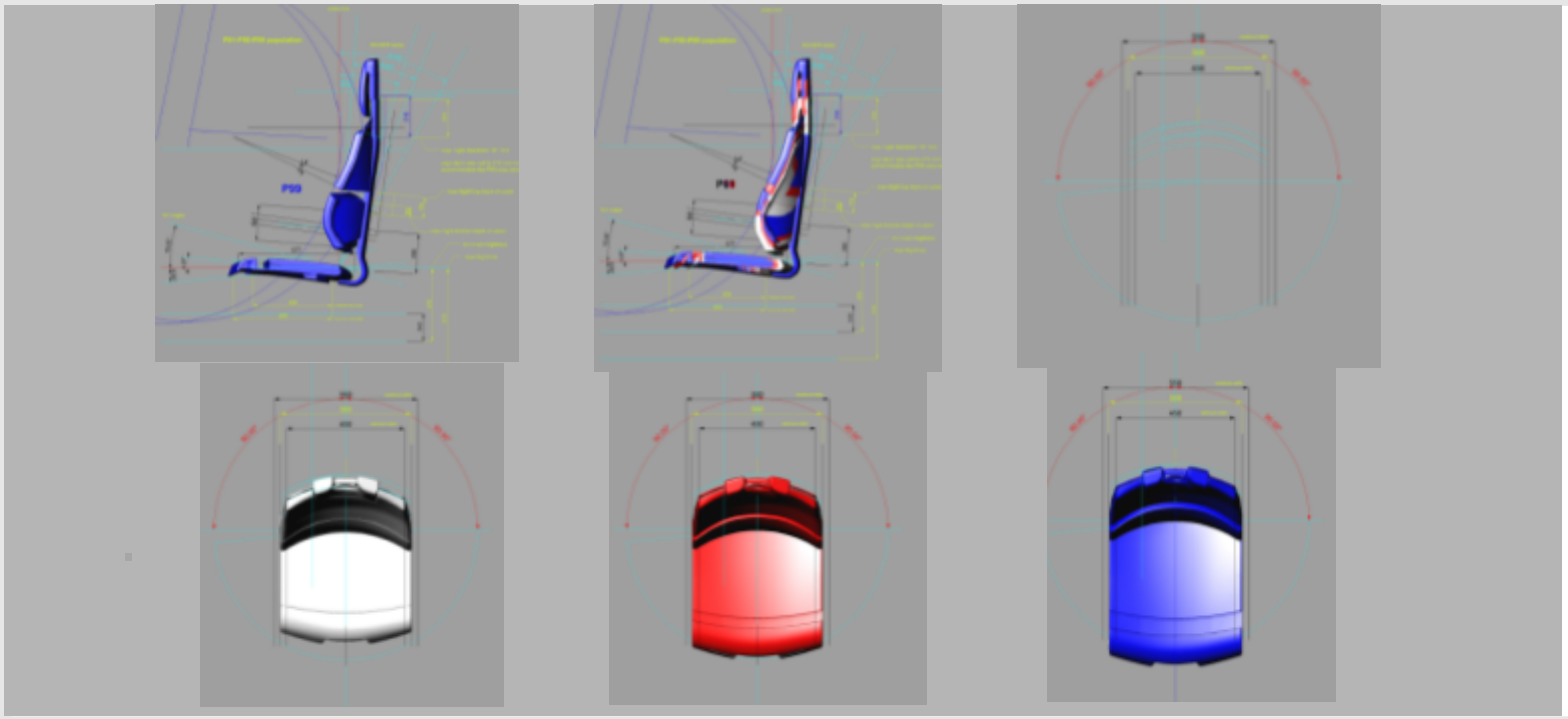
alfa 0.1 | dimensions P98 (2)



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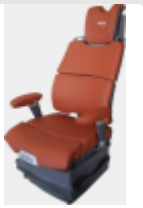
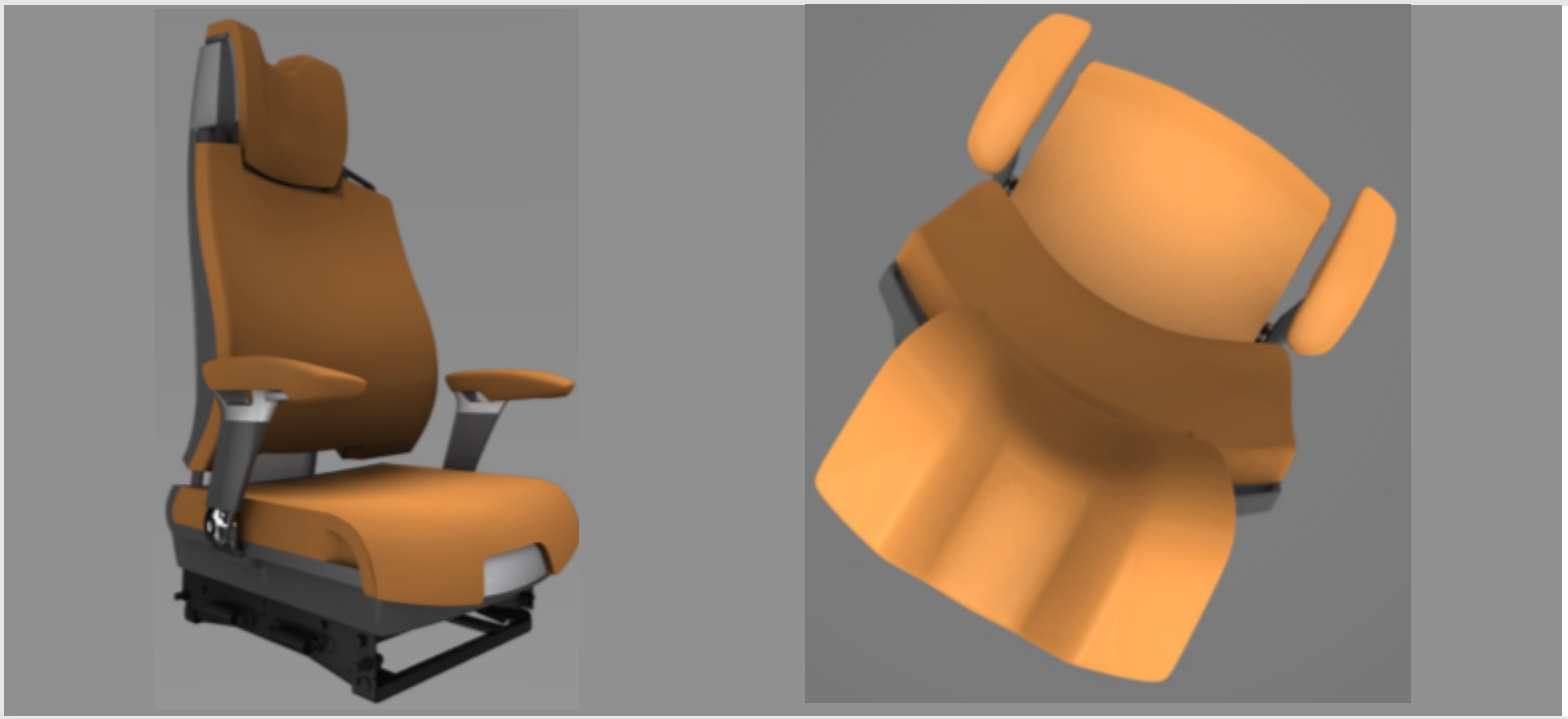
alfa 0.1 | the concept seat





alfa 0.1 | the making of the proto (1)

Thanks to David Blackmore † (2010)

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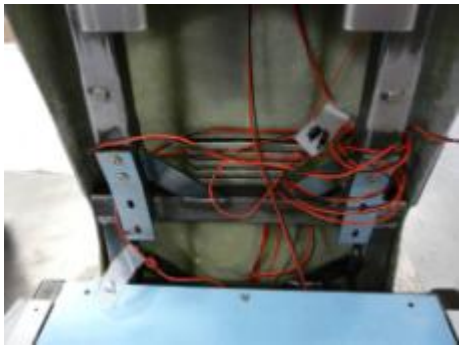
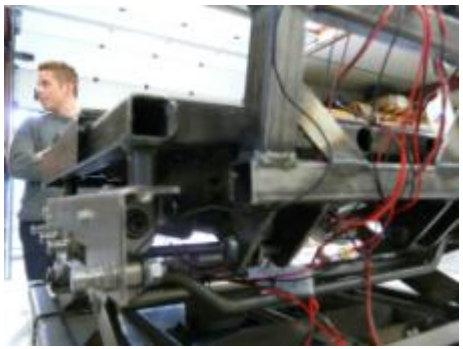
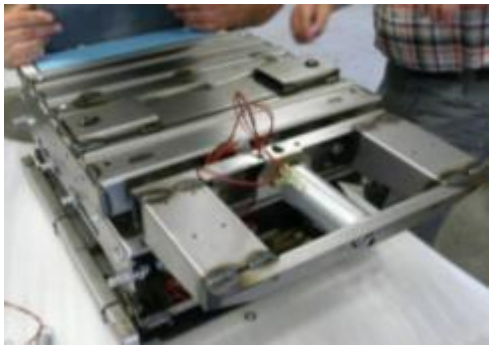
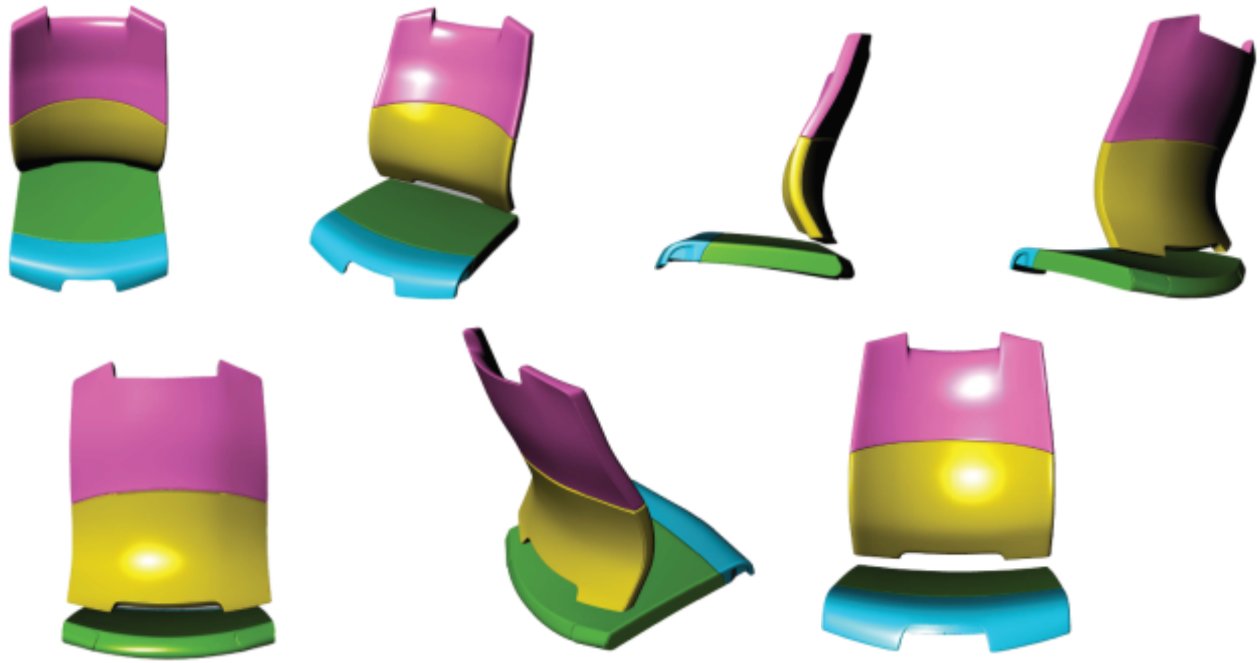
alfa 0.1 | the making of the proto (2)







alfa 0.1 | designing cushion sets (1)



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alfa 0.1 | designing cushion sets (2)

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alfa 0.1 | the product

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alfa 0.1 | marketing

- introduction:
  - Busworld 2009
  - Railway Interiors 2009
- **GO or NO GO?**

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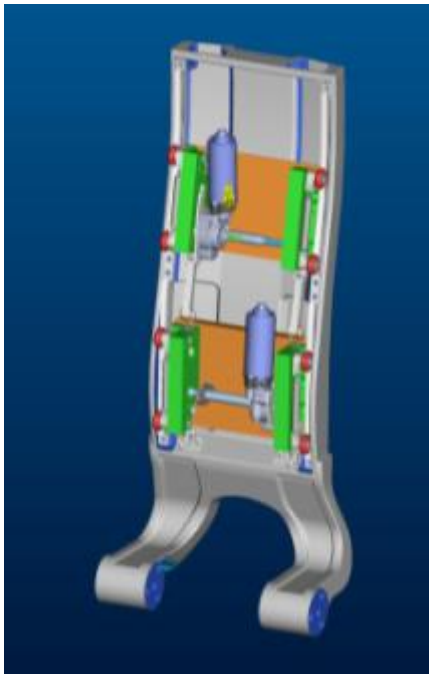
alfa 0.1 | improvement points

- head rest adjustment
- back curve
- movements
- cutting line backrest
- upholstery
- finger protection
- software

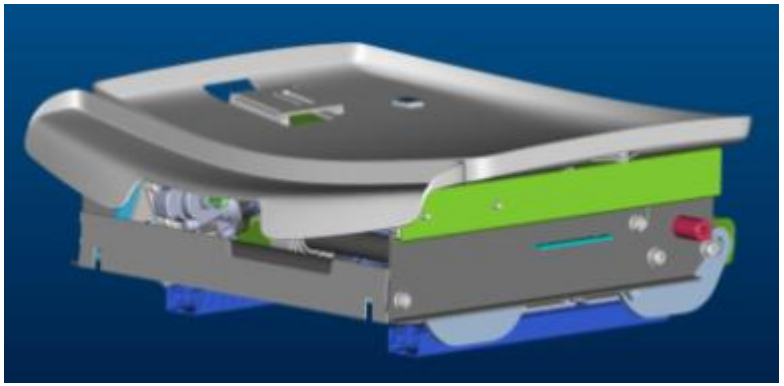
bêta 0.1 | redesign

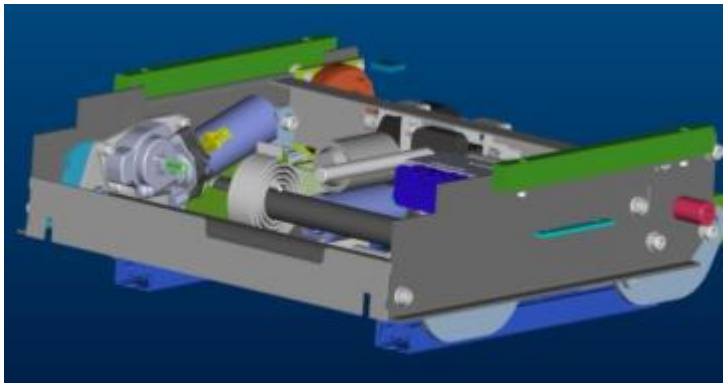
- complete new structure
- optimising design
- design study cushion sets
- armrest

bêta 0.1 | technical lay out (1)



beta 0.1 | technical lay out (2)

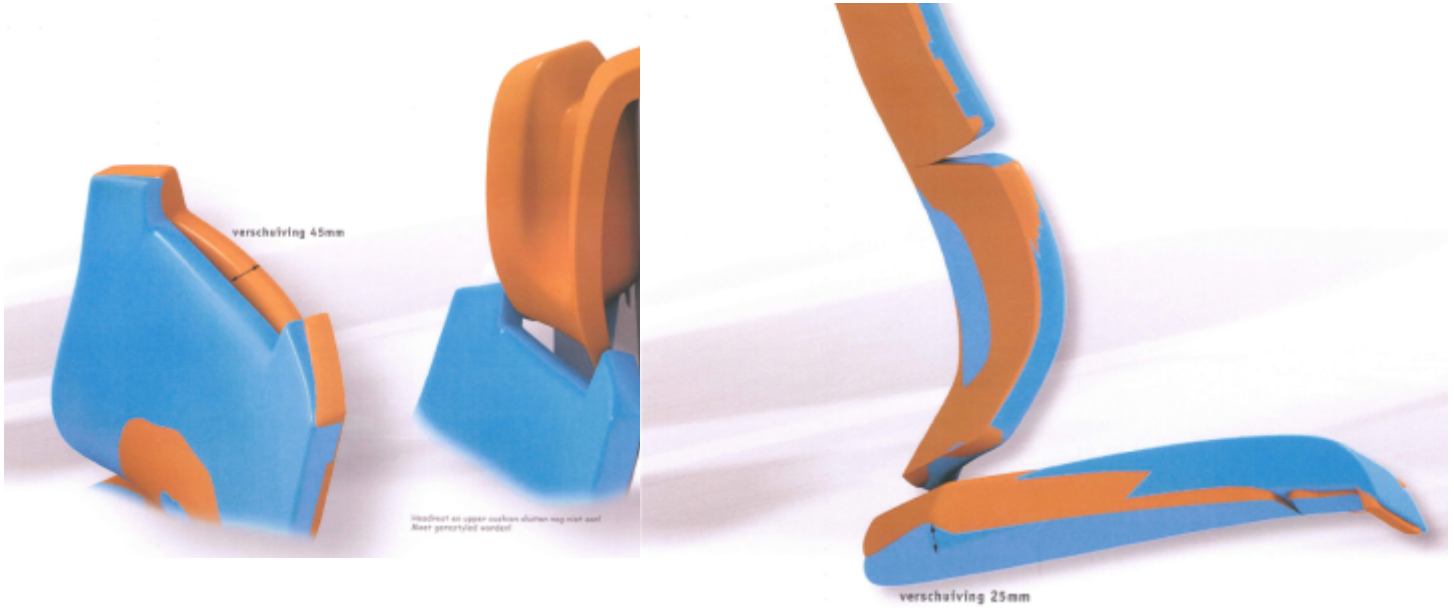




bêta 0.1 | design study cushion sets

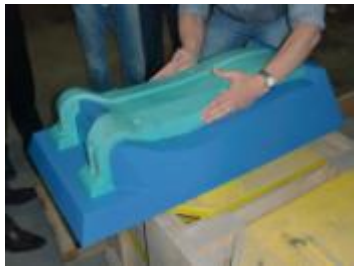
bêta 0.1 | evolution cushion sets (1)

bêta 0.1 | evolution cushion sets (2)



bêta 0.1 | evolution cushion sets (3)

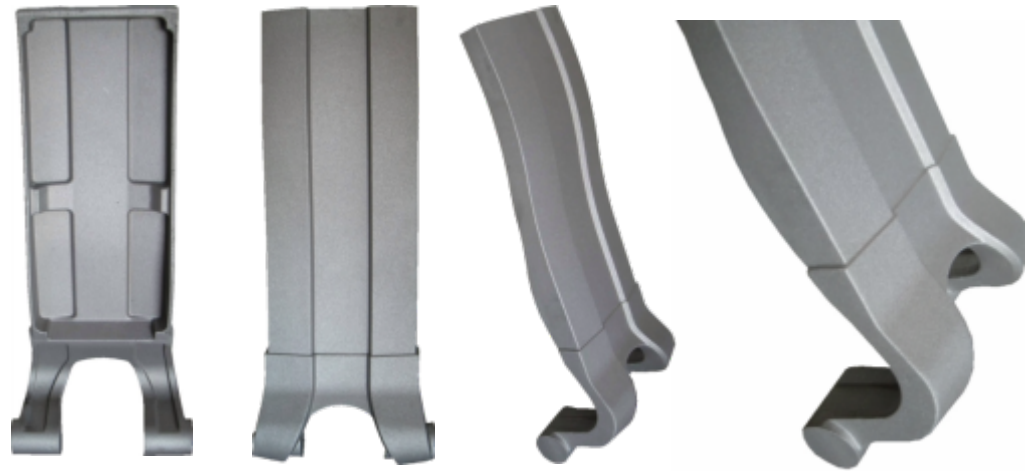
bêta 0.1 | moulding





► bêta 0.1 | back



bêta 0.1 | height riser & frame

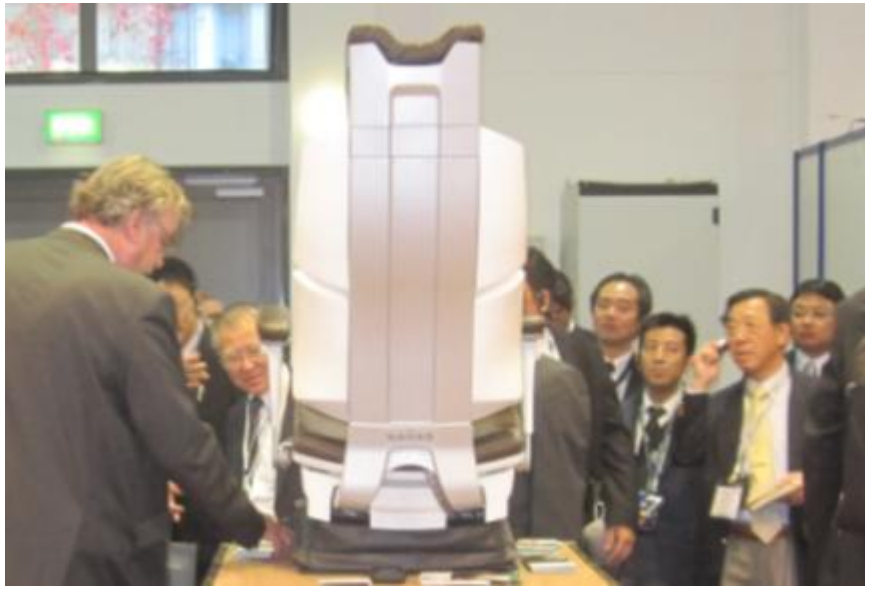
bêta 0.1 | seat covers

bêta 0.1 | armrest (power supported)

bêta 0.1 | the product

bêta 0.1 | marketing

- exhibitions
  - Innotrans 2010
  - Railway Interiors 2011
- customers



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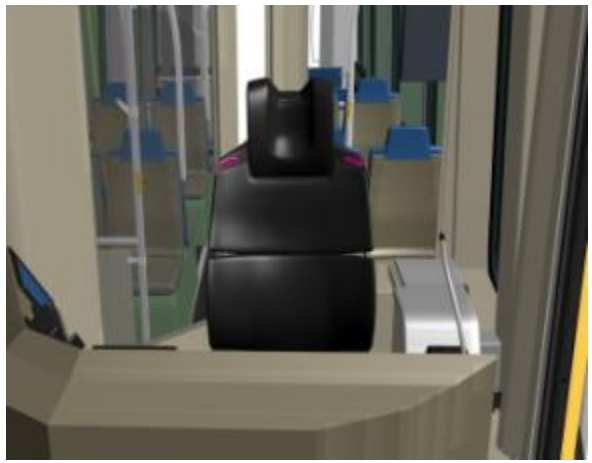
bêta 0.1 | testing at customer (1)



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bêta 0.1 | testing at customer (2)

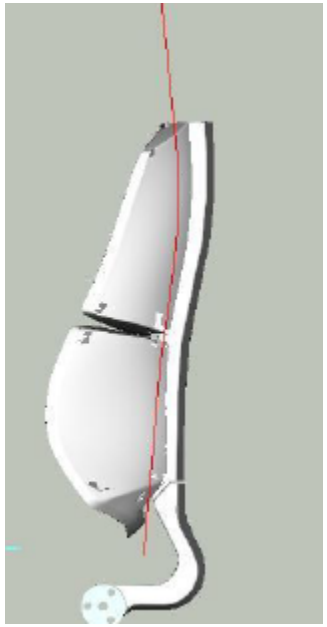
bêta 0.1 | improvement points

- optimising back curve (testing)
- new cushion plates
- headrest construction
- covers
- upholstery
- armrest
- sensors – motors – software
- cables
- finger protection

bêta 0.1| optimising back curve (1)

bêta 0.2 | optimising back curve (2)

orange lines = mock up curve
green curve = ergo curve
red curve = Enthoven curve
orange curve = current curve



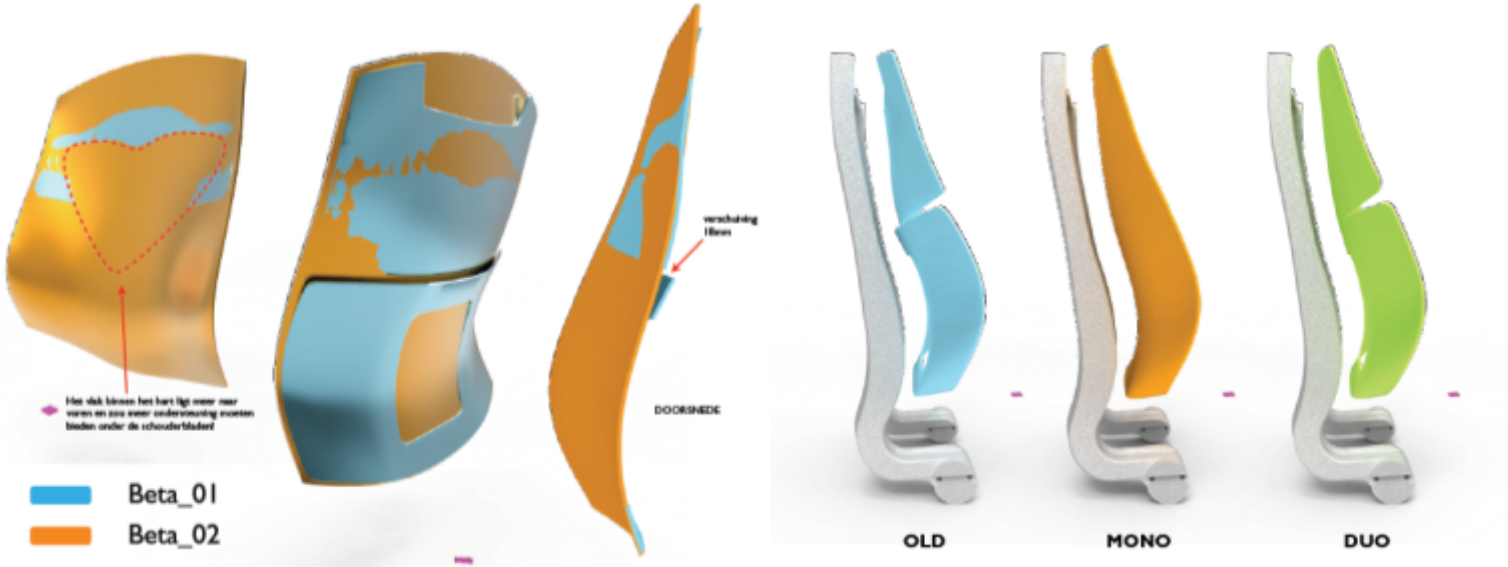
beta 0.2 | optimising back curve (3)

GAP between new back and old cover.

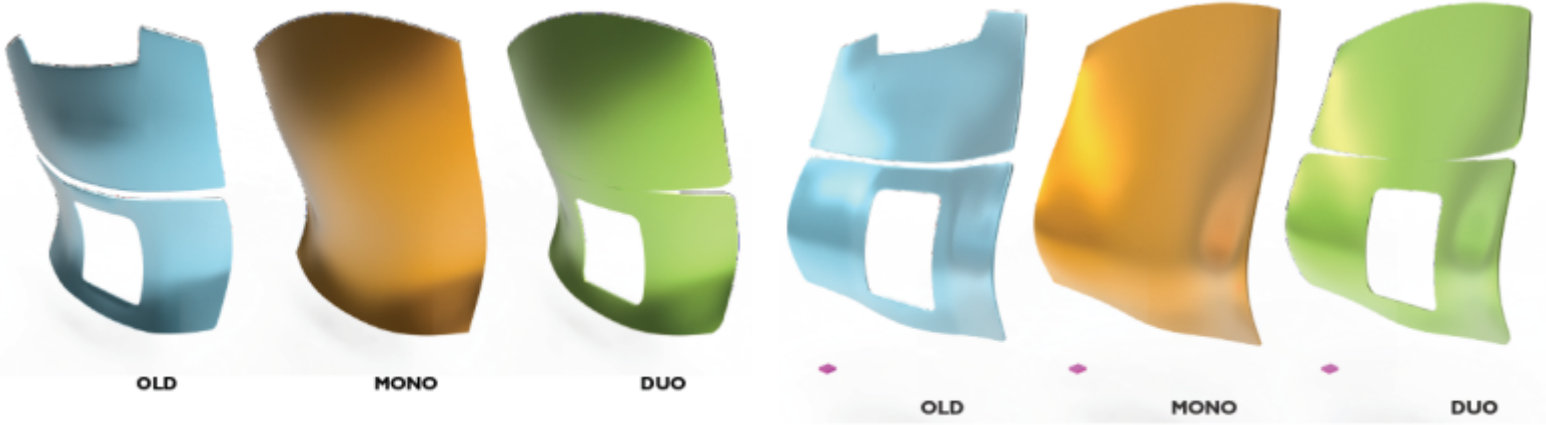
▲ bêta 0.2.| testing back

► according to M1 road vehicle class

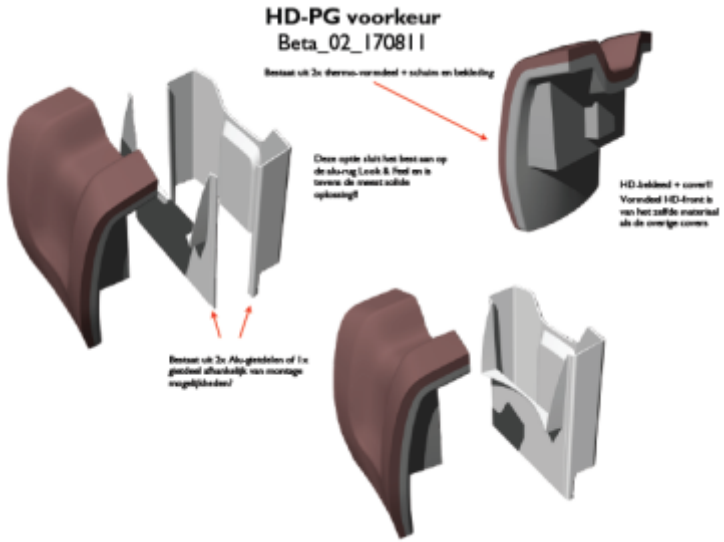
bêta 0.2 | new cushion plates (1)

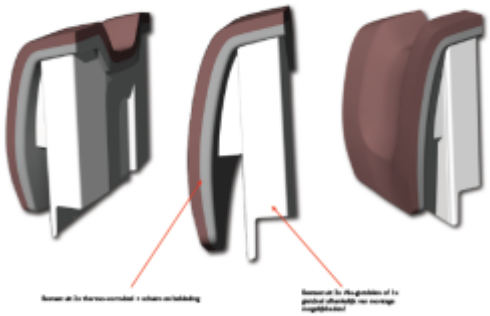


bêta 0.2 | new cushion plates (2)



bêta 0.2 | head rest 0.2





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beta 0.2 | covers - choice

Leather look fireproof

Leather look - detail

Leather look - detail

black fireproof

Metallic not fireproof

Metallic black not fireproof

Shining white not fireproof

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bêta 0.2 | covers – upholstery

Cover:
leather look
soft touch
fire proof (rail)

Upholstery:
black leather

bêta 0.2 | covers - headrest

Cover:
leather look
soft touch
fire proof (rail)

Upholstery:
black leather

bêta 0.2 | mounting of the cushions (1)

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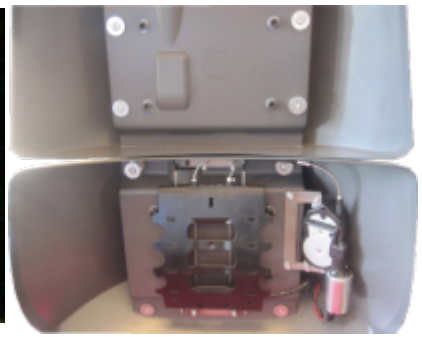
bêta 0.2 | mounting of the cushions (2)

- covers wit magnets instead of Velcro
- rapidly interchangeable



bêta 0.2 | sensors - motors - software

- Electric design with CANBUS lay out to make seat variations quickly possible during production process
- Motors are fitted with sensor to make adjustments per driver possible

bêta 0.2 | cables

- cabeling isolated according to railway isolation standards

cover plates

back rest wiring

bêta 0.2 | the product

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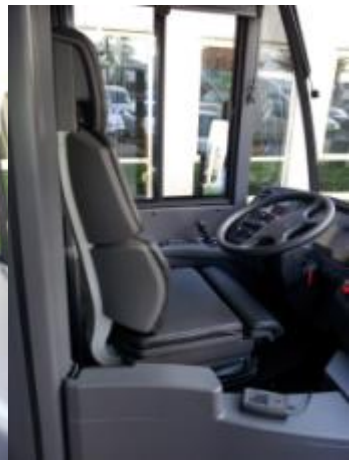
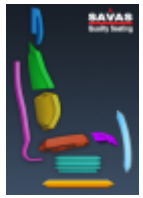
bêta 0.2 | marketing

- product ready for Busworld 2011
- customers

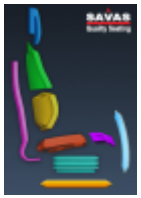


operation control | possibilities

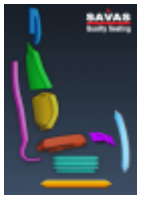


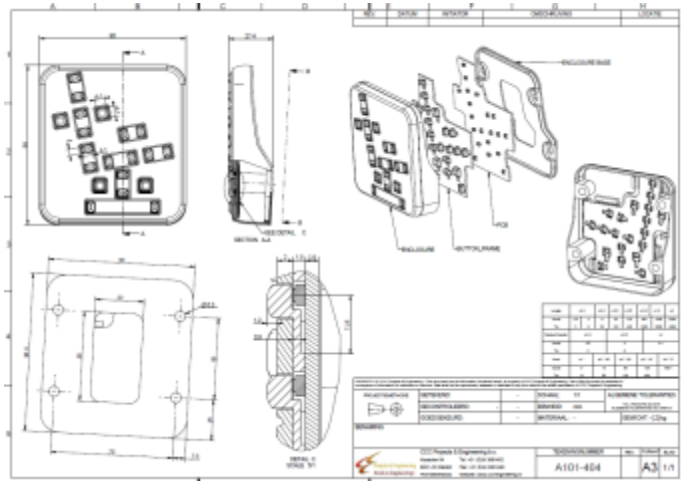
- electrically by memory (recalling driver data)
- electrically by GUI
- GUI menu
- manually override by buttonbox
- future capabilites

operation control | electrically by memory recall / GUI



► operation control | manually by button box





operation control | GUI menu

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operation control | GUI menu

upgrade to seat management system interface

- touch screen panel for flexible use
- ethernet control
- infrared control
- multi motor management
- multiple screen images for: seat control,communication, environmental control, heating,cooling, seat massage, dynamic comfort adjustment, belt use control, data collection for maintenance and further design reviews etc.

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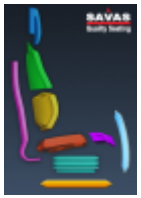
operation control | future capabilities



▲ thank you for your attention