CAVA - MANIKIN

Functional Overview

2023-04-20

CAVA – Vehicle Homologation

Vehicle Compliance is a compulsory part of Automotive design. CAVA (CATIA Automotive Extensions Vehicle Architecture) provides the solution to efficiently and confidently validate the compliance of your vehicle design and architecture against international standards and regulations.

Available as a CATIA V5 or 3DEXPERIENCE enhancement, CAVA is successfully used by OEMs and suppliers world-wide and can be installed as a complete solution or as individual sub products for specific application areas.

CAVA Product Portfolio

- **CAVA OVA:** Verify the overall vehicle packaging

- **CAVA Manikin:** Verify seating positions, pedals and headroom

- **CAVA Vision:** Analyze the direct and indirect vision of the driver

- **CAVA Safety:** Analyze safety of occupants and pedestrians

- **CAVA Wiper:** Analyze wiper kinematic and wiping quality

- **CAVA Tools:** Project the silhouette outlines of a complete vehicle with one click using Silhouette Tools

# CAVA – General Features
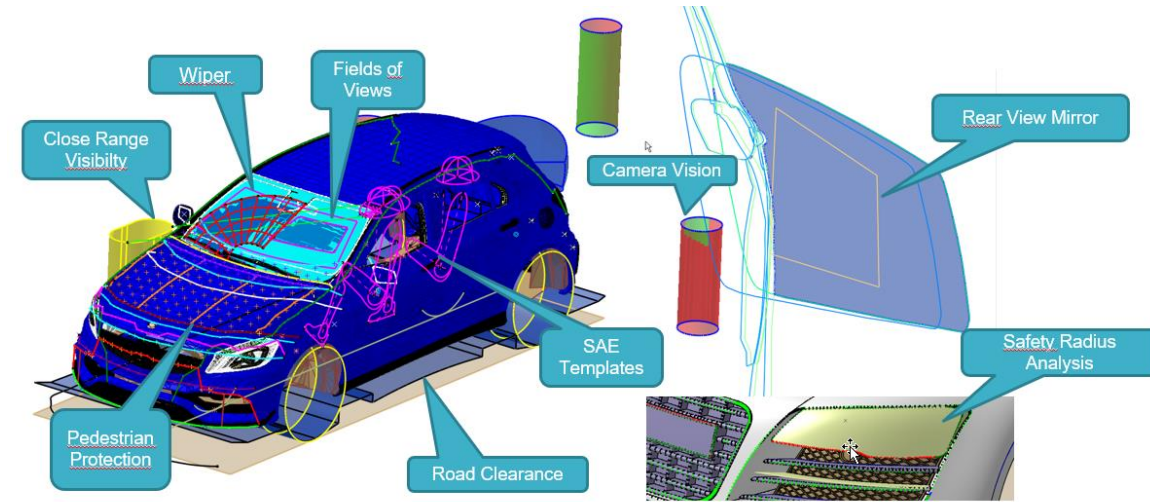
Integration into CATIA

- CAVA is integrated into CATIA as a separate workbench or App.
- CAVA features are stored directly with the CAD data.
- Working in part and product context.
- Automatic feature update on change of any input parameters or changed geometry.

Configurable and Open

- Supported Standards are available as readable xml file.
- You can create your own adapted company-specific standards easily.
- Export your results as regular CATIA Geometry for downstream applications, readable without CAVA.
- Create textual, excel and drawing reports using customizable report templates.

Base Data Concept

- Organize relevant parameters in a central location.
- Define vehicle size, wheel size, driver and occupant placement.
- Define different ground reference planes to accommodate loading configurations.

EXPERIENCE MATTERS

TECHNIA
ADDNODE GROUP
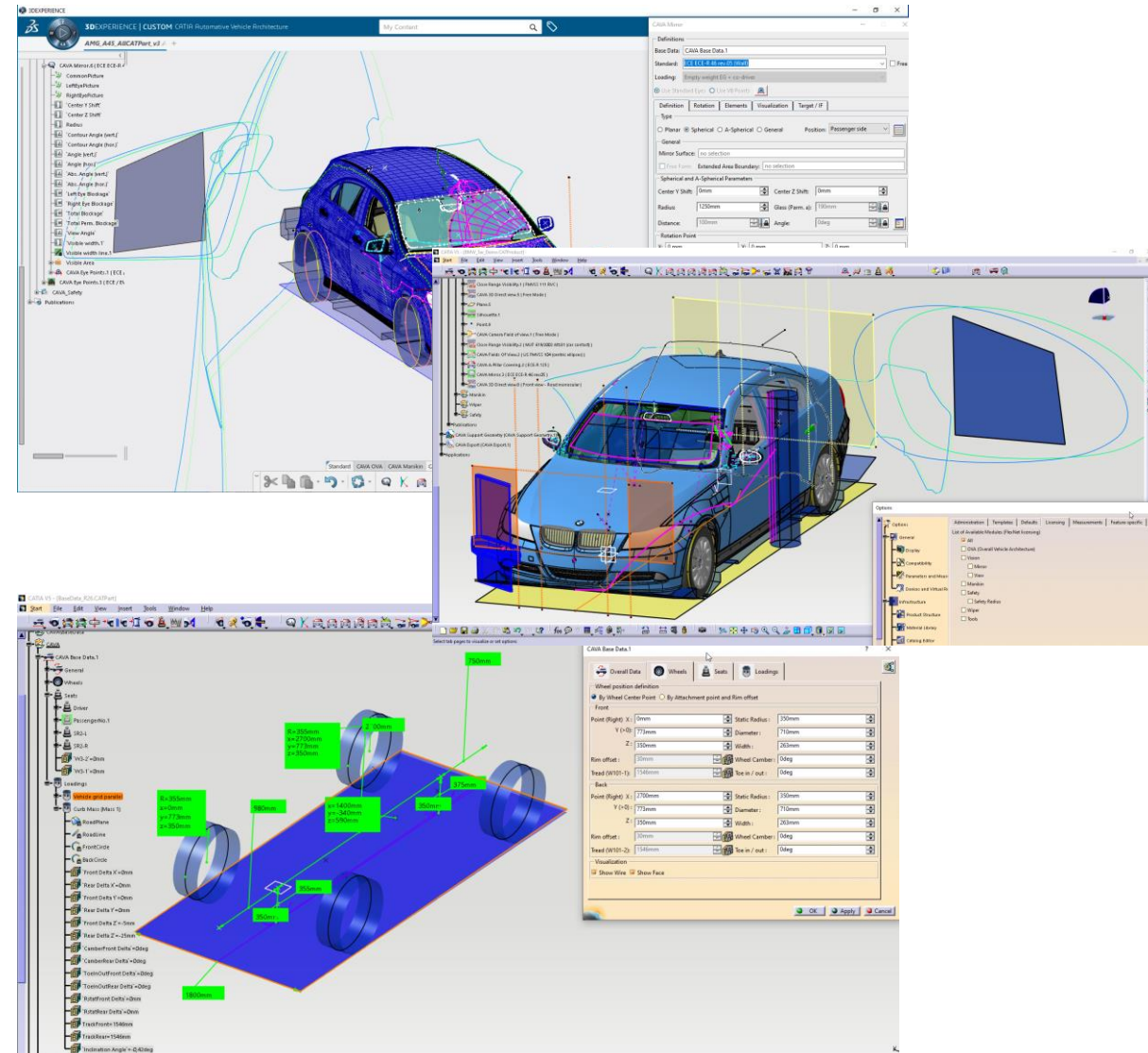
CAVA Manikin – Eye Points and Eye Ellipses

These CAVA functions simplify the tasks to create Eye Points and Eye Ellipses as required by international vision analysis standards.

Supported standards
- Eye Points: ECE / EWG, ADR
- Eye Ellipses: FMVSS / SAE J941 (1965, 1997, 2002)

Features
- ECE Eye Points (V-Points, O-Points, P-Points) according to UNECE-R 125 for different purposes in vision and mirror analysis.
- SAE 941 Eye Ellipses as required by FMVSS vision standards
- Considers SRP point, seat back angle, seat travel, percentile and other seating parameters

Result
- Eye Points and Eye Ellipses positioned based on the selected standard and on seating parameters from CAVA Base Data
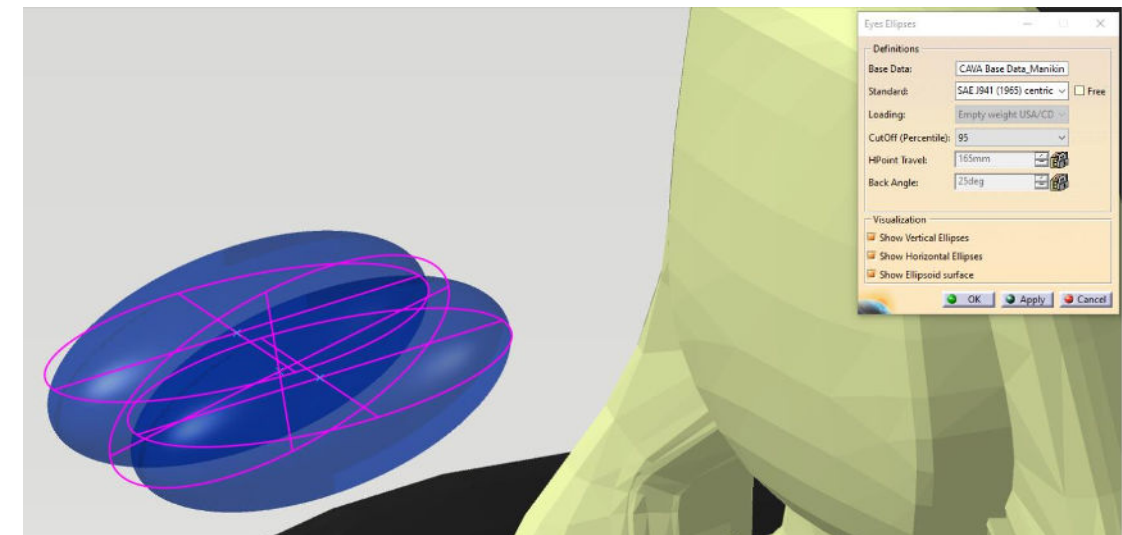
CAVA Manikin – 2D-Manikin Template

This function creates the 2D SAE Manikin template in different percentiles. Practical positioning options are available to help to define a good seating position as well as floor and pedal position and shape.
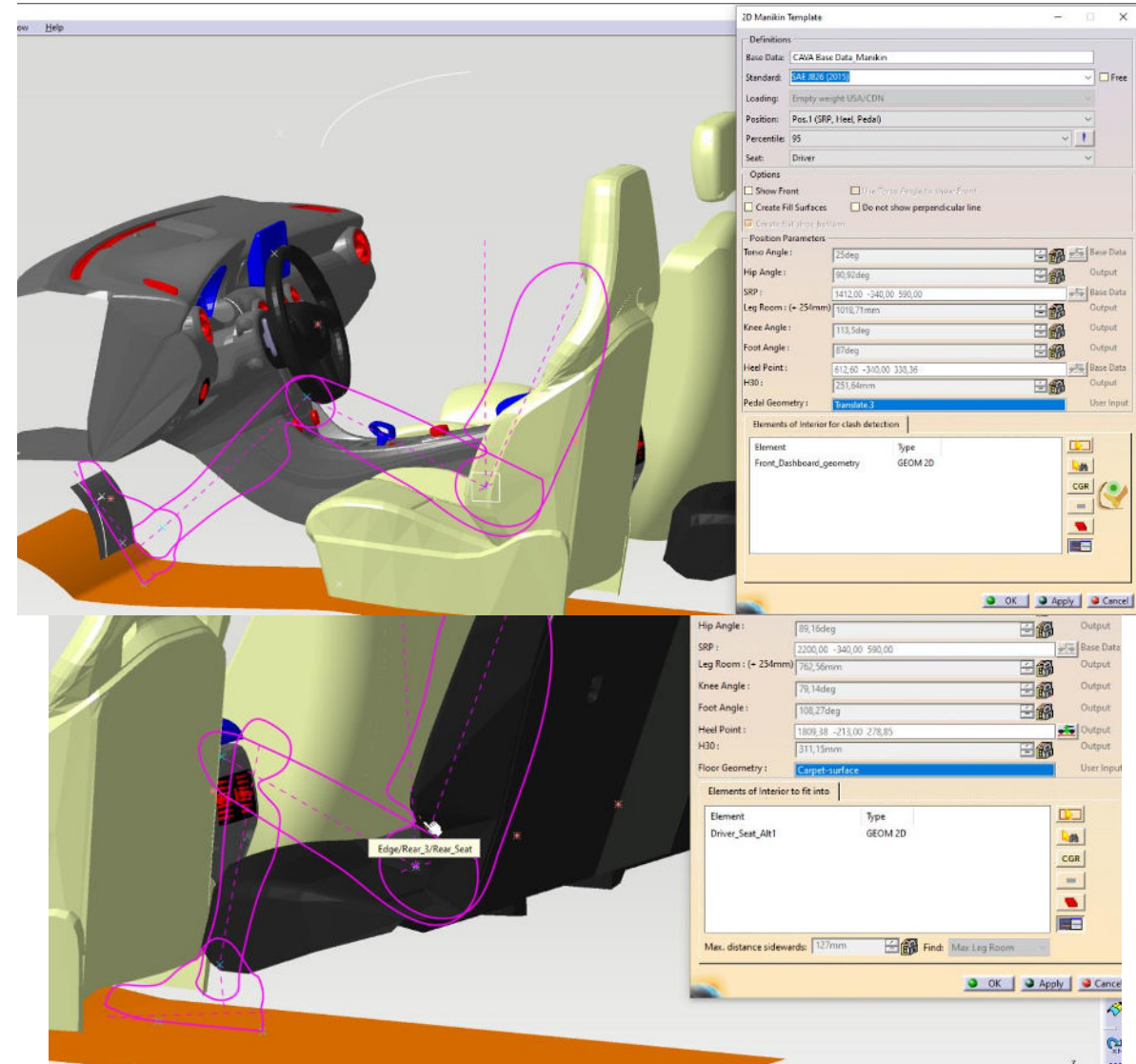
Supported standards include:

- SAE J826/" (2015, 2016) – flat shoe and classic shoe

Features

- Manikin template of 95th, 50th and 10th percentile and user defined values
- Positioning methods based on seating reference point (SRP and input parameters to determine heel point and pedal position
- Positioning methods to determine SRP based on heel, floor and pedal
- Measurement of legroom for rear passengers

Result

- Manikin template positioned as per method and constraints
- Output of reference points and measurements for the joint angles, seating height and leg room
- Clash feedback

CAVA Manikin – SRP Location Curves

SAE SRP location curves are designed to provide a good and ergonomic SRP point for a given percentile, pedal point, seating height and legroom.
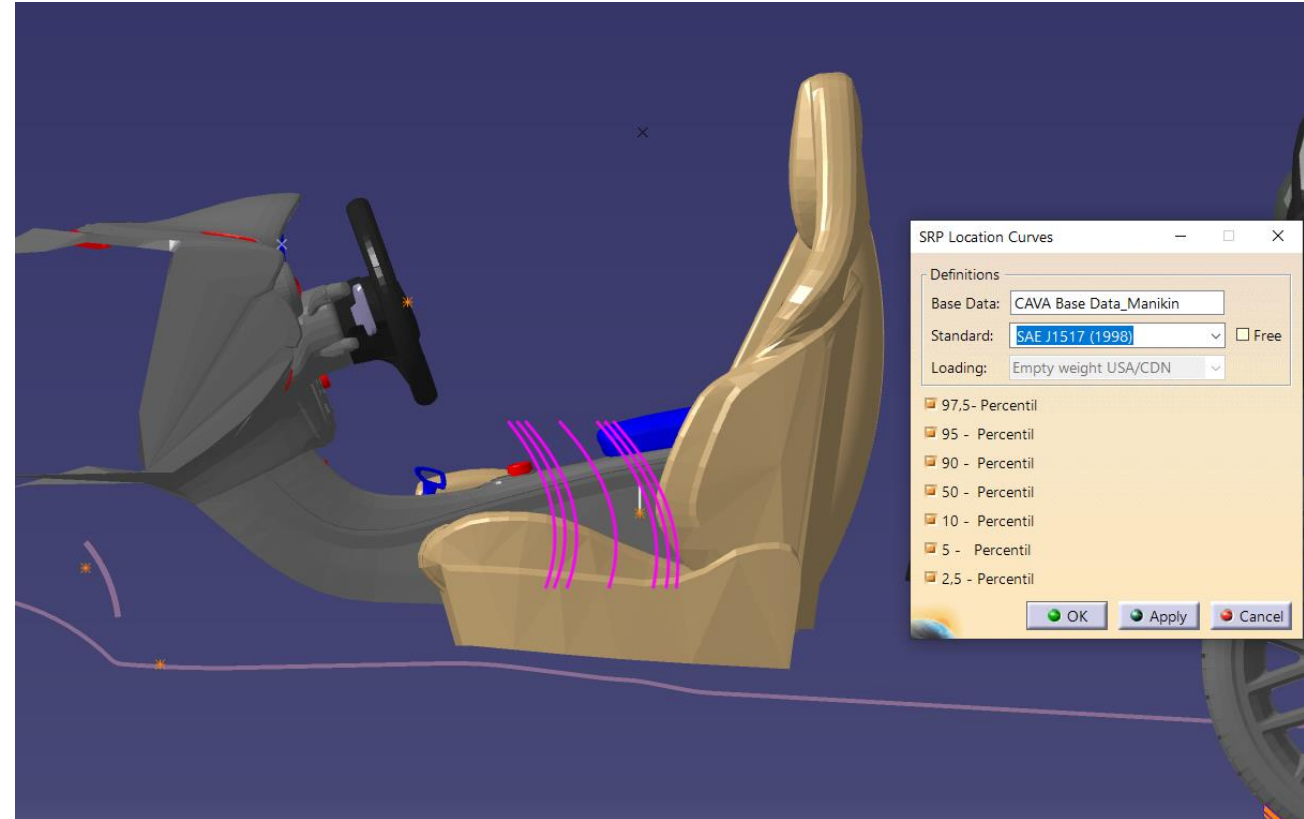
Supported standards
- SAE J1517, SAE J4004

Features
- Required input parameters are taken from CAVA Base Data
- Selectable percentiles
- Included in specific Manikin positioning methods

Result
- SRP location curves positioned based on percentile and on seating parameters from CAVA Base Data

CAVA Manikin – Head Position Contour

The SAE Head Position Contour describes an area of the position of an occupant's head for given percentiles. This CAVA function facilitates the required headroom measurements.
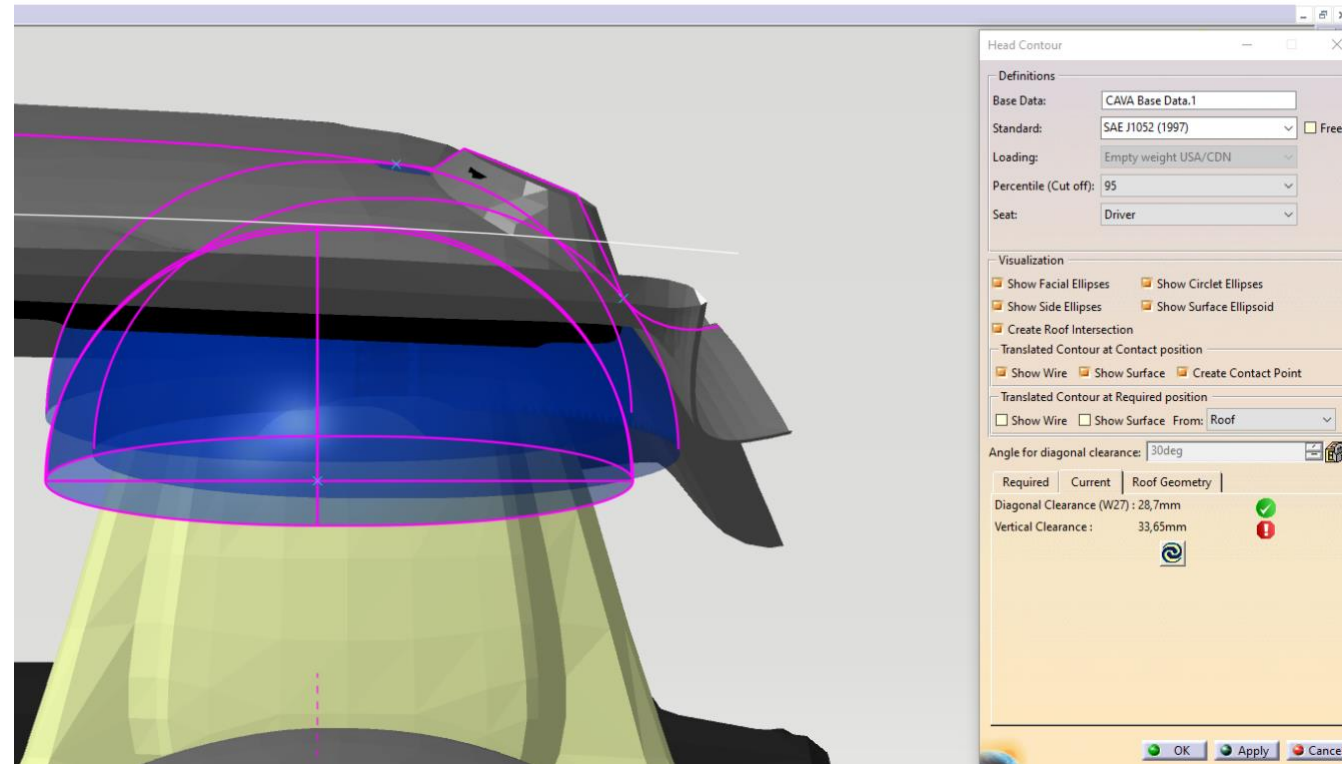
Supported standards

- SAE J 1052 (1997, 2002, 2010)

Features

- Creates the shape of the ellipsoid according to SAE for a selected seating position
- Measurement of the values H35 („vertical head clearance") and W27 („head clearance diagonal")
- Display contact point and displaced position at contact point
- Transition of the ellipses in vertical and diagonal direction in relation to roof or origin position

Result

- Check result if required clearance is achieved
- Visualization elements for HPC and displaced shapes for contact measurements

CAVA Manikin – Headrest Measurement Device

This feature facilitates the determination of the backset and height as measured with the headrest measurement device (HMD) according to FMVSS and NCAP.
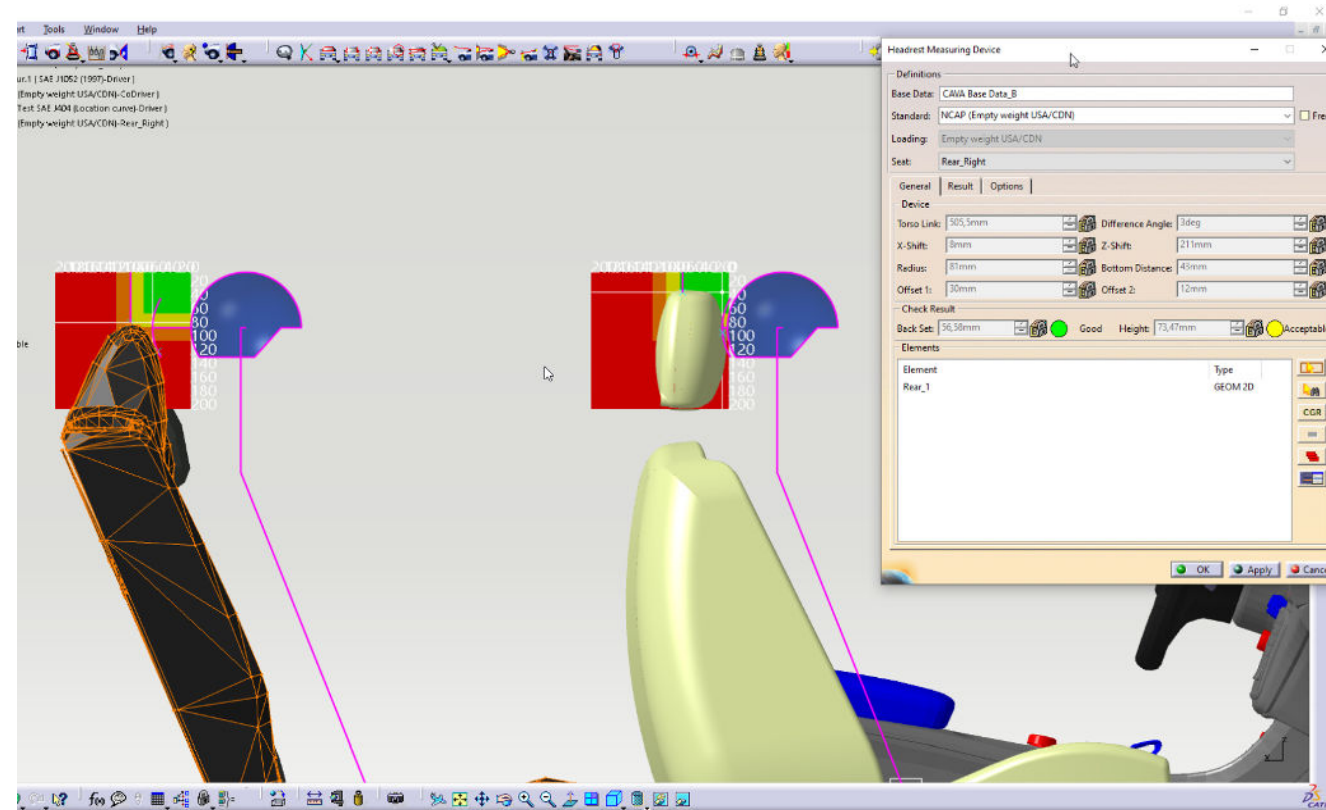
Supported standards include
- FMVSS 202a
- NCAP

Features
- Measurement with a head form placed according seating parameters
- Graphical display of backset and height measurement
- 2D-View display of the standards evaluation schema
- Optional visualization of the view pyramid planes

Result
- Check result classified according to limits in the standard

EXPERIENCE MATTERS

CAVA Manikin – Head Rest Validation

This function checks the width and height of the headrest in respect to roof clearance distance.
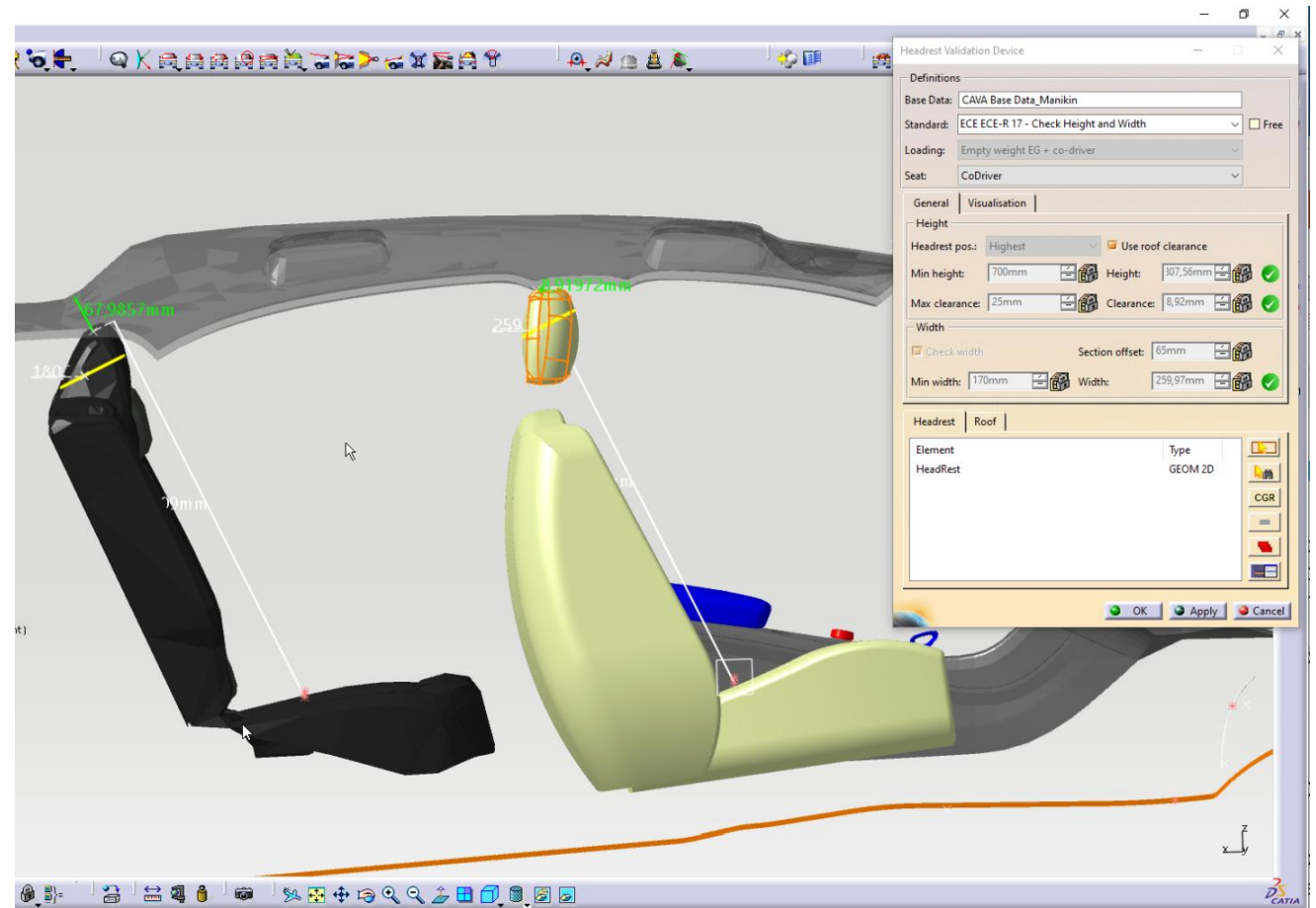
Supported standard
- ECE-R 17 (Height and Width)

Features
- Measures and displays maximum width of the headrest in the required plane
- Measures the height of the headrest for lowest and highest position at each seating position
- Measures and considers clearance to the roof

Result
- Check result if head rest width is within limits
- Check result if head rest height is within height limits

CAVA Manikin – Hand Reach Zones

This function helps to determine the Drivers Hand Reach Zone as defined in SAE J827.

Supported standard

- SAE J827

Features

- Calculates General Package Factor from the Base Data Seat parameters
- Considers seat belt restraint type and population mix
- Hand envelope calculated for
  - Full hand grasp
  - 3 Finger grasp
  - Extended finger grasp

Result

- Calculated General Package Factor
- Graphical feedback of the Hand Envelope