February 2024

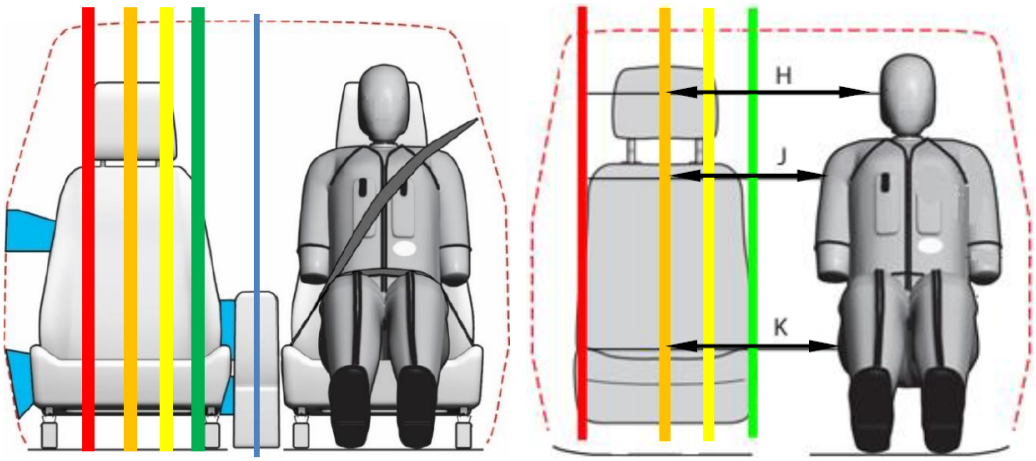
FalCon Mov6D: 6D Viewer

Version 1.00

1. Application

Euro NCAP – Far Side Occupant Test & Assessment Procedure

- Instrumentation: WorldSID 50th male dummy (ISO 15830)
- Defined excursion limit lines:
  head excursion performance limit (orange, yellow and green)
  vehicle centerline (blue)
- Pre-test measurement: H distance “head side to seat centerline”

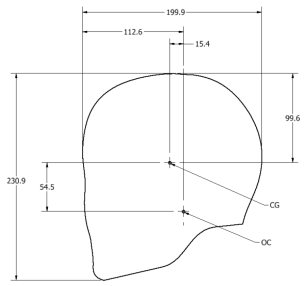


2. Analysis by Mov6D

- Prepare a dummy head and attach many marker stickers of different size and type.

- Measure the centers of the markers best by using a photogrammetric tool.
- Edit a text file in format FalCon eXtra ASCII *.apt:
  list all control point data and names of the markers and define them as members of a 6D object.
  See https://www.dr-gerhard.de/en/faq.html for specification and sample file.

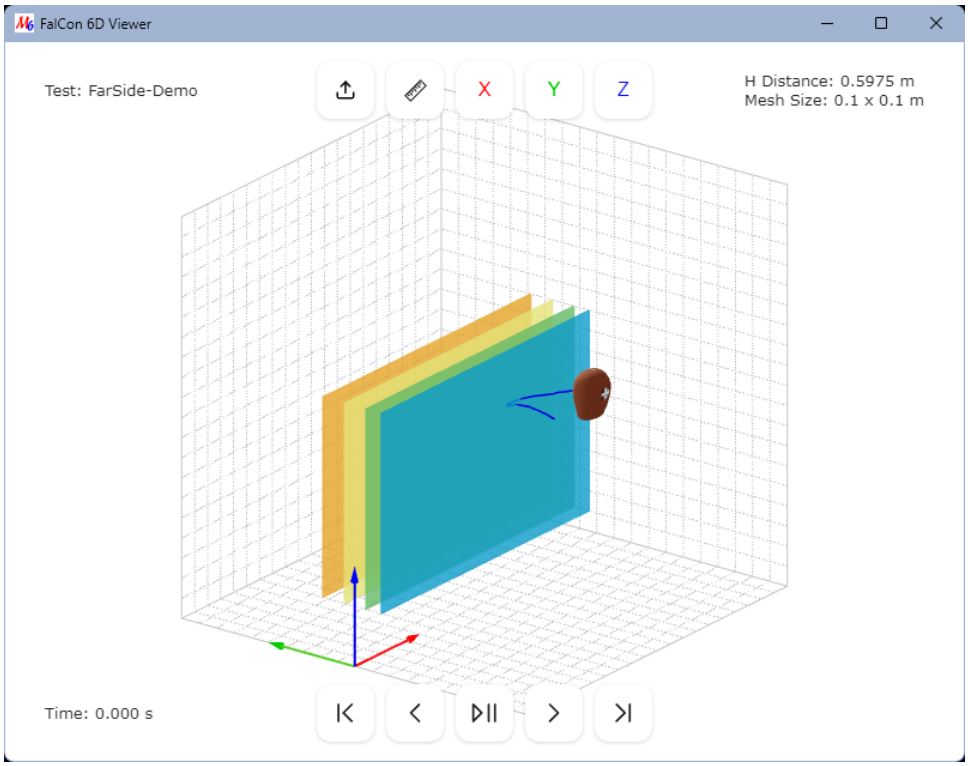
- Additional requirement: control point data of the center of gravity. Extrapolate from the top point (Δz = -99.6 mm) or from the side markers aligned at the z-height of CG (width 158.5 mm).
  See the dimension of the WorldSID head:



Add this point as virtual marker (name = *CG*) to the apt file.

- If these coordinates are not relating to the vehicle system add a couple of control points on the BIW. These markers should be distributed in the field of view. If the high-speed video is captured by an onboard camera, they help to compensate shaking. Note, that they need to be visible during the whole impact video.
- Track all markers as long as possible.
- The head is assumed to be a virtual rigid body. The parameters of its 6DFoF motion are automatically calculated by a photogrammetric method: standard monocular view (= 1 camera) or stereo views (= 2 cameras).
- The motion can be defined as relative to a reference time or as relative to a (moving) reference coordinate system.
- Check the parameter H distance, which is required for assessment of Far Side tests.
  If the exact value is not available, it can be set by the assumption that the position of CG @ T0 is in the center of the driver's seat.
- Export to ASCII file *.txt or binary file *.p6d, which is compliant to the 6D viewer.

3. 6D Viewer



- Viewer with fixed default window size, resizable
- Fixed orientation of car coordinate system, see “z” from bottom to top
- Mesh size of grid = 0.1 x 0.1 m
- Units = m, s
- Colored, semipermeable planes:
  blue @ y = 0
  orange @ y = head-side – H
  yellow @ y-orange – 125 mm
  green @ y-orange – 250 mm

  Note:
  Thickness = 10 mm
  The threshold limit is exceeded, if the head passes the left (!) side of the “glass plane”.

- Mouse handling:
  Rotate by left mouse button pressed
  Pan by right mouse button pressed
  Scroll (Zoom) by mouse wheel
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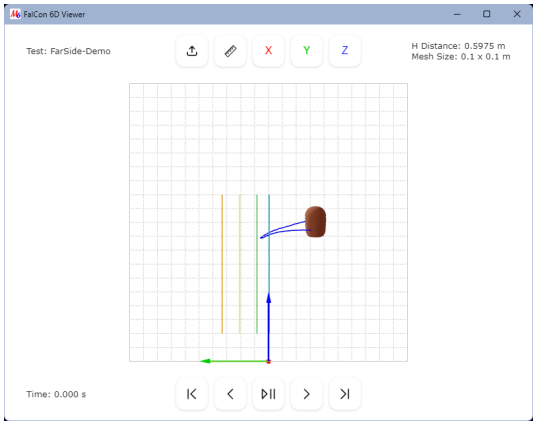
  Upload binary 6DoF file *.p6d or open the viewer showing the data directly by clicking the Show button in the dialog ‘X Diagrams’ of the Mov6D analysis.
- Play buttons:

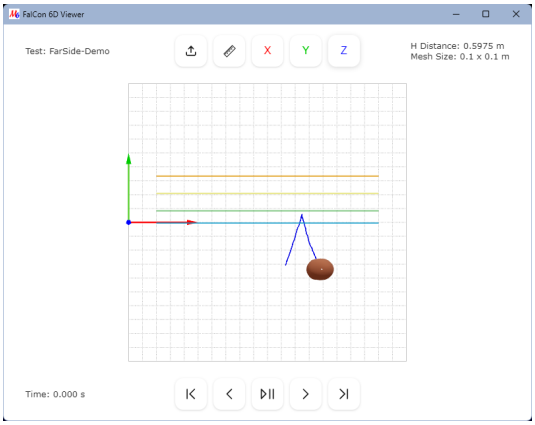
  Play forward or backward, if Ctrl key is pressed, next click = pause
  Press space = play or pause
  Goto start, end
  One step forward / backward
- Auto-orientation buttons:

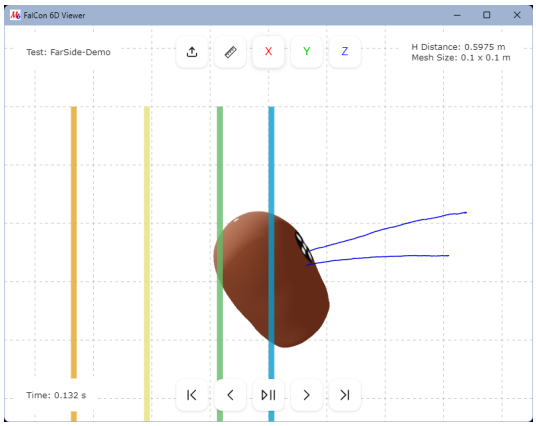
  Select view axis:
  X = front view, Y = side view, Z = top view

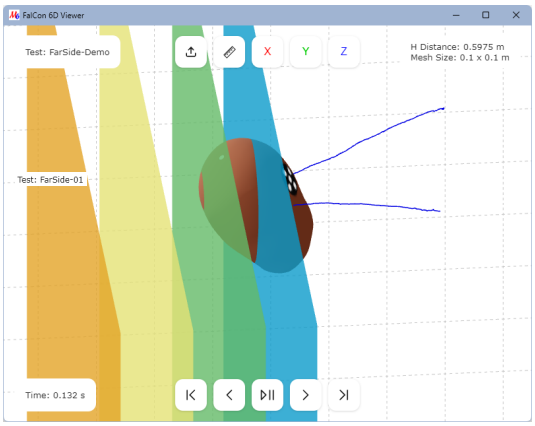


front view



top view

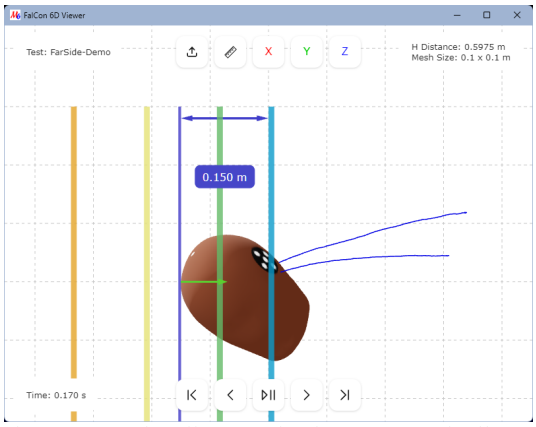


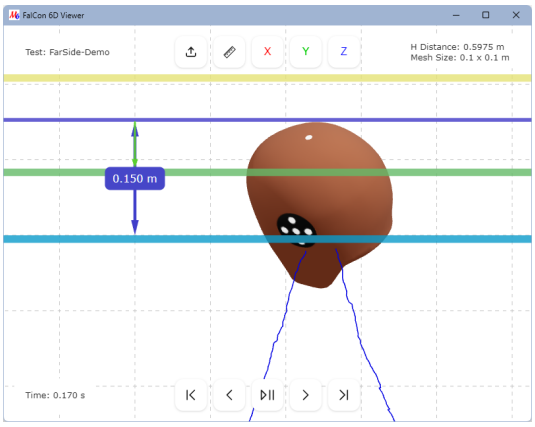


head passing the green excursion limit

- Measurement tool:

Shift the purple ruler plane in y-direction by grabbing the green arrow with the cursor
y-value is valid from the right (!) side of the plane to the plane @ y=0





the measured y-distance is shown numerically