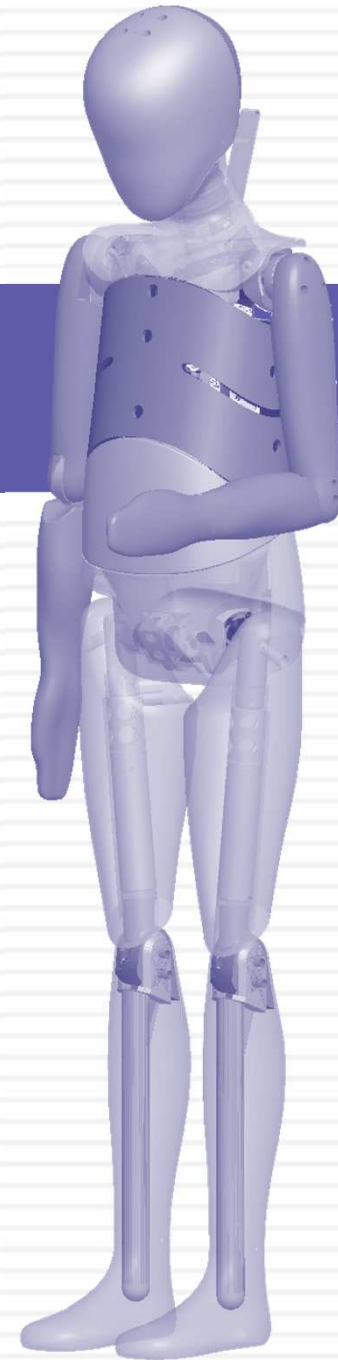
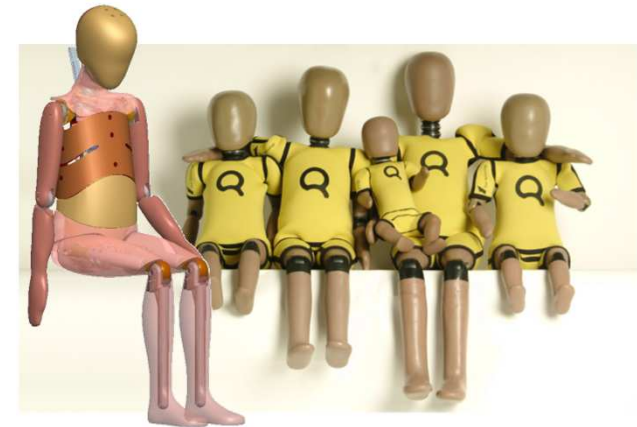


Q10 Production Version SBL-B

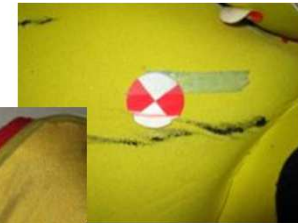


Design Update Background

- Q10 Developed in EU FP7 EPOCH
 - TRL, Dorel, IDIADA, Surrey, Humanetics
 - 300 tests in R44 and NPACS setup
 - Reported at PoCC 2009, 2010 and 2011
 - **Recommendations for dummy updates**
- Evaluation in 3rd party program
 - BAST, ADAC, UTAC, BMW, AUDI, Daimler, Porsche, TRW, Autoliv, Takata, Dorel, Britax
 - >100 tests in vehicle environments
 - Results discussed May 2012
 - **Recommendations for dummy updates**
- Continued testing by JAMA and others

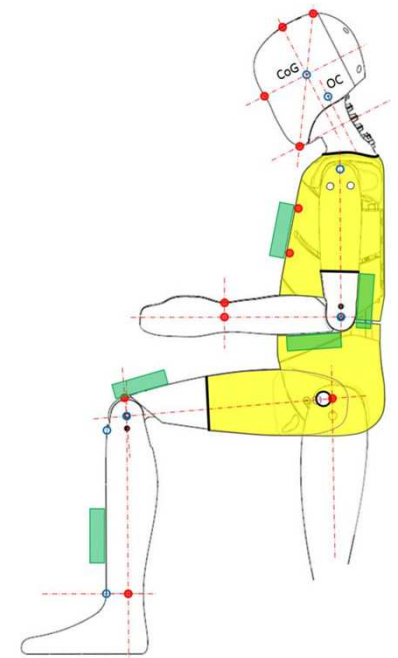
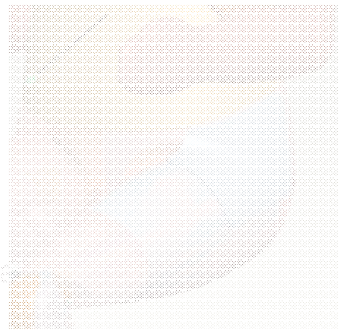
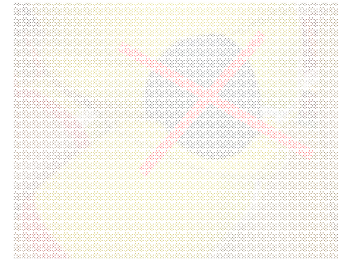
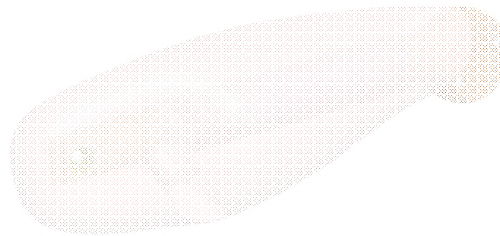
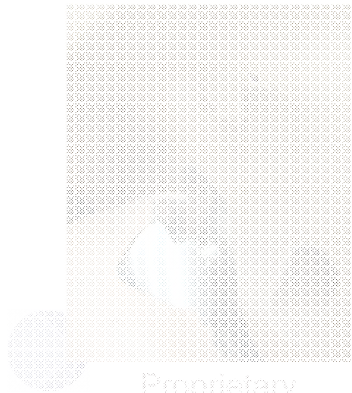
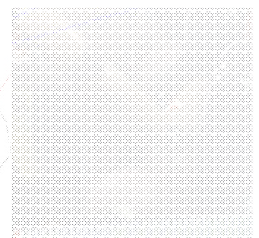
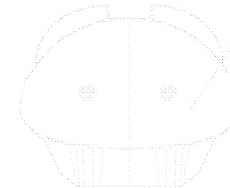
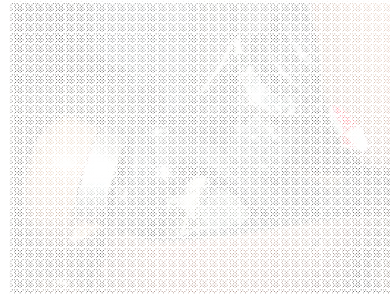
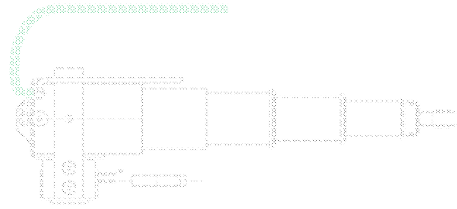
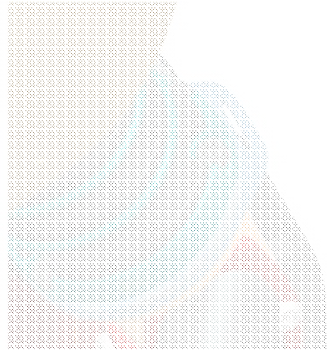


Examples of reported issues



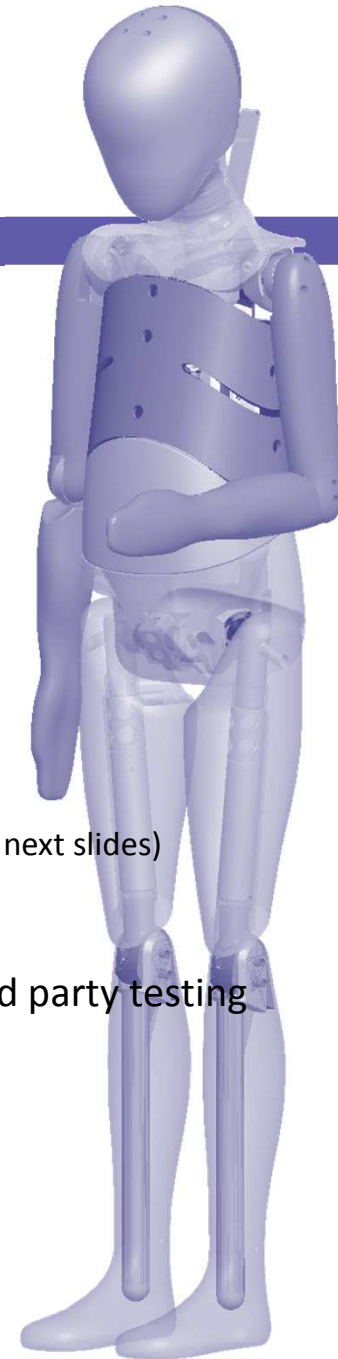
Examples of design updates

To be implemented in production version end 2012



Status

- A Q10 production version is currently under development
 - Addressing issues raised in EPOCH and third party testing programs
 - Items needing decision from Stakeholders:
 - ▶ Belt penetration in pelvis thigh groin
 - ▶ Belt – suit interaction
 - ▶ Side impact performance
 - ▶ Injury thresholds
 - ▶ **Abdominal sensor**
 - Solutions (not affecting development of production version dummy):
 - ▶ Belt penetration dealt with using hip shields
 - ▶ Belt slip occurred after introducing Cordura layer in suit
 - ▶ For side impact a kit consisting of minimal number of parts under investigation (see next slides)
 - ▶ Injury thresholds proposed by EPOCH to be further evaluated
 - ▶ Abdominal sensor: research item which should not affect abdominal behaviour
- Currently reporting to EOM's, suppliers and research groups involved in third party testing program
 - Mainly EU, Far East
 - Includes Euro NCAP labs BAST and UTAC
- Need decision making on issues by group like EEVC WG12 or alternative
 - Input data EPOCH and third party testing program



Example Pelvis – Thigh groin

Lap belt penetration



Patch effectiveness - Post test pictures

w/o



w/



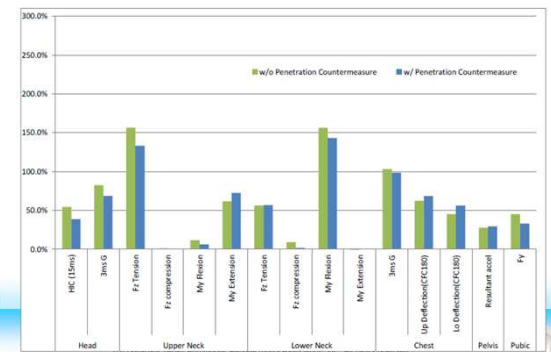
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Lap belt penetration



Patch influence – overall result



66

Lap belt penetration



Summary

- New patch has a potential to prevent "Lap belt penetration" kinematics.
- A little differences were observed by presence of the patch in dummy measurements.
- Those differences were caused by the kinematics change.
- Time history curves at lumber spine exhibited different characteristics.

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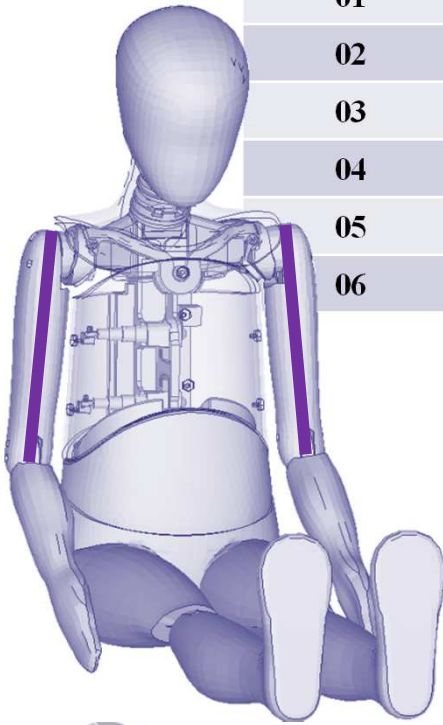
68



Example Side Impact Kit development

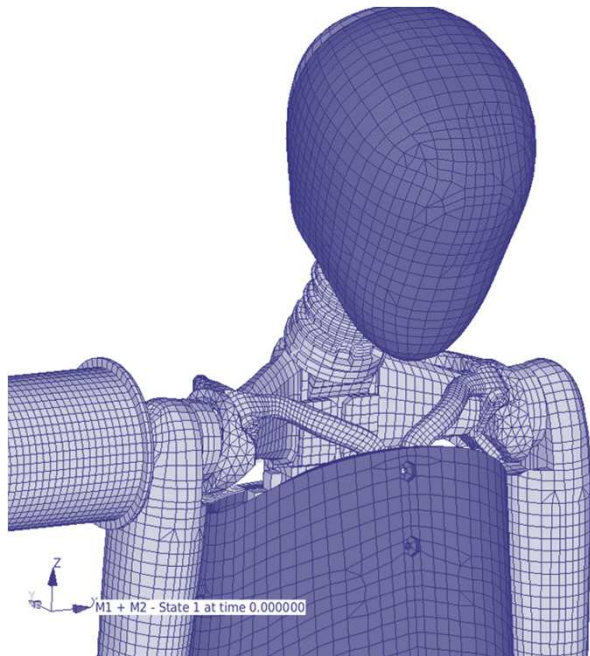
Lateral impact kit with limited parts affected

Simulation s	Baseline Q10 Version 1.0	NO Lower Arms	Upper Arm Bones in plastic	NO Clavicle (not preferred)	Shoulder rubber CUTOUT
00	X				
01	X	X			
02	X	X	X		
03	X	X		X	
04	X	X			X
05	X	X	X	X	X
06	X	X	X		X

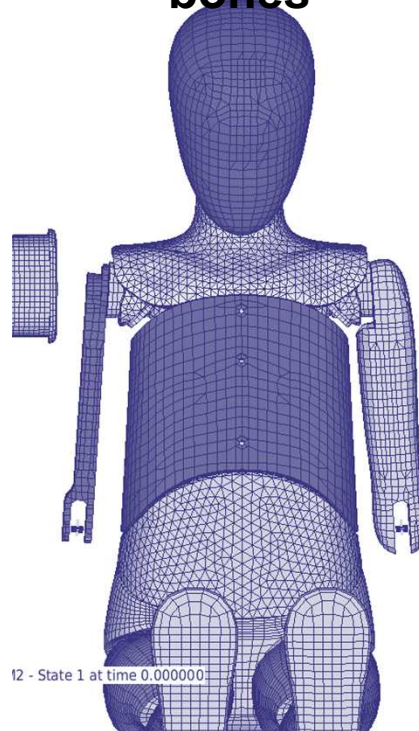


Example Q10 Side Impact Kit Development

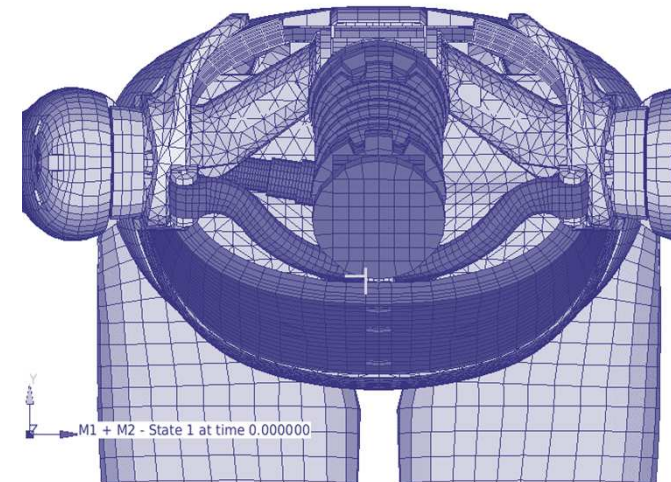
**Run 01 - Baseline
w.o. lower arms**



**Run 02 - As run 01 +
plastic upper arm
bones**

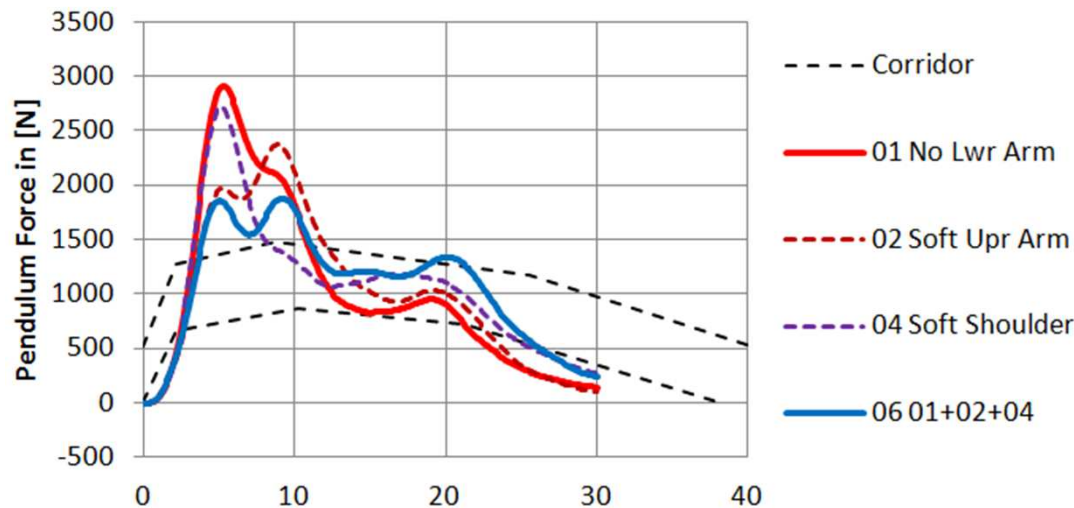


**Run 06 - As run 02 +
cutout shoulder rubber**



Example Q10 Side Impact Kit Development

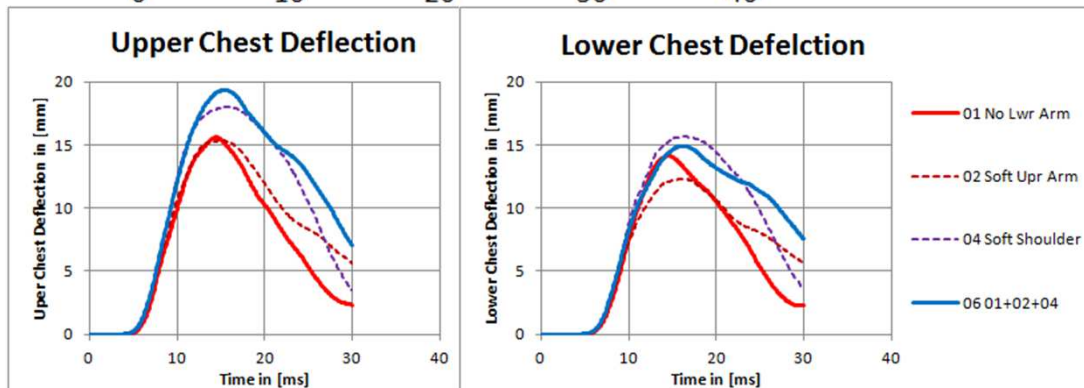
Pendulum Force



Two changes with major effect on pendulum force

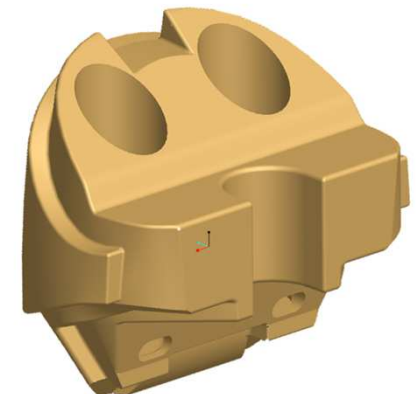
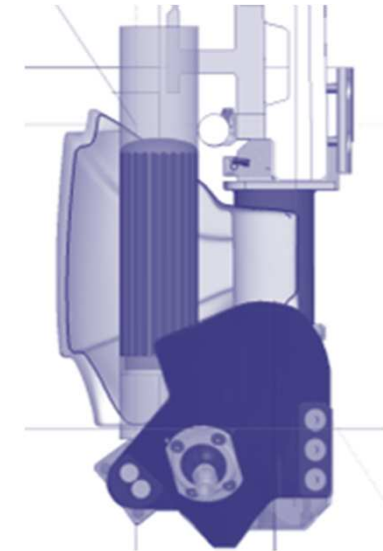
compared with 01 No Lower Arms

- 02 01 + Plastic upper arm bones
 - Pendulum force peak at 5 ms reduced (-33%), at 9 ms increased (+11%)
- 04 01 + Cutout Shoulder Rubber
 - Pendulum force peak at 5 ms reduced (-7%), at 9 ms reduced (-33%)

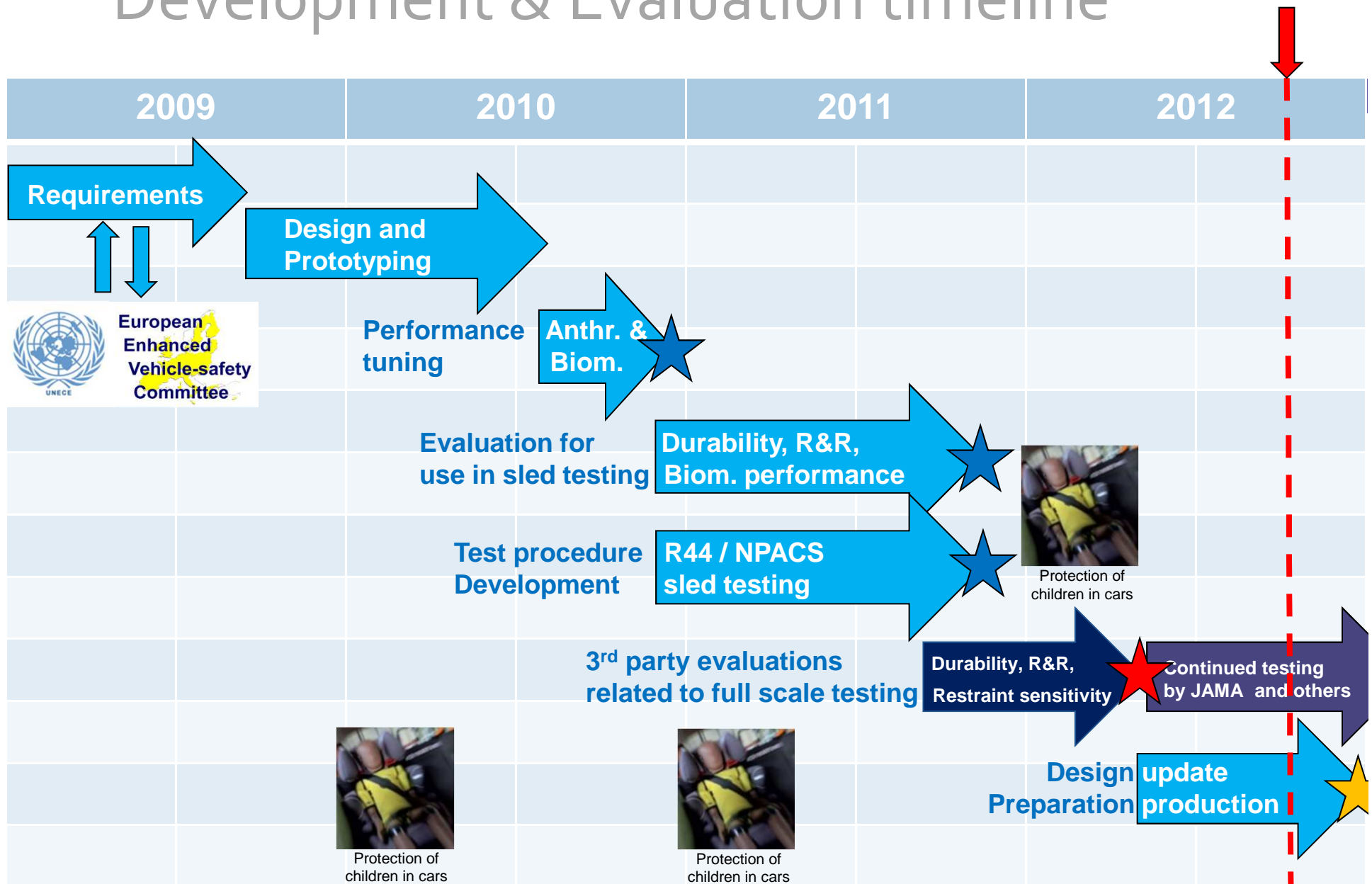


Abdominal sensor

- Developed in Child and CASPER
 - Potential for future usage to identify belt penetration
- GRSP Informal Group on CRS included the sensor on the agenda for next meeting



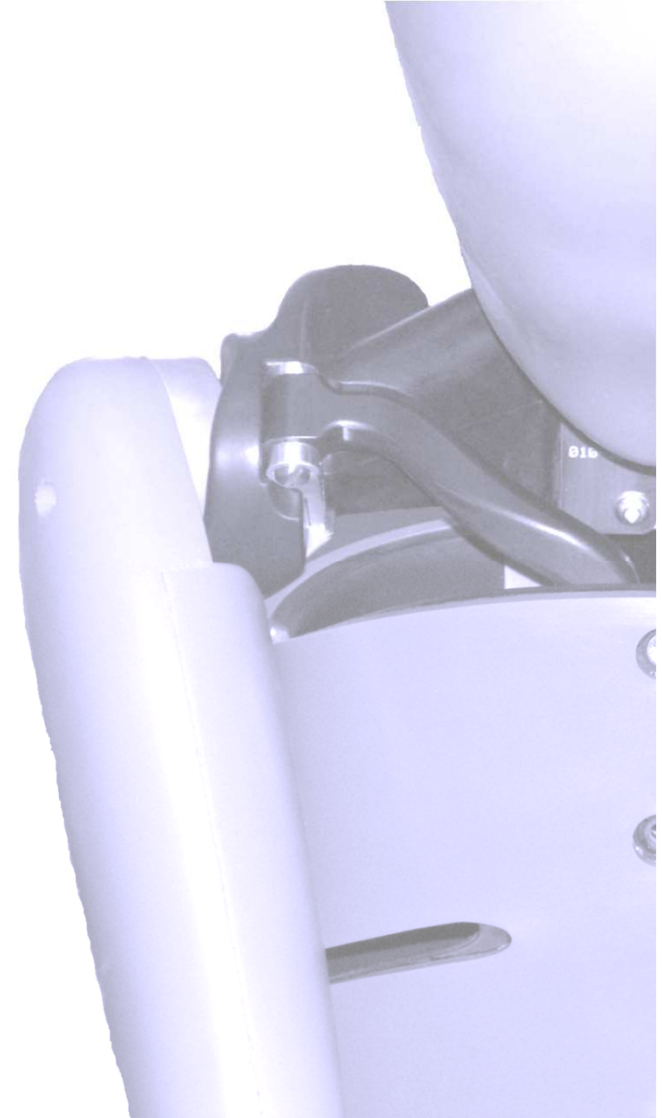
Development & Evaluation timeline



Outlook



- GRSP IWG Child Restraint Systems introducing Q10 in updates of R44
 - Most probably frontal testing only
 - Side impact under discussion as protection for this size might have to come from vehicle
 - Timing: 2013 – 2014
- Euro NCAP introduction of Q6 and Q10 as rear seat passengers in front and side testing under discussion
 - Discussions will start in Child Occupant Protection group by November 2012
 - Use of integrated seats?
- ADAC (ETC) and TRL are considering introduction of Q10 in their consumer rating programs
 - Timing: 2014



A pink humanoid robot is positioned in a laboratory or industrial setting. The robot has a smooth, pink head with a small black and white crosshair on its forehead. Its torso is composed of a blue and pink mechanical structure with a spring-like appearance. The robot's arms are extended, and its legs are also pink. In the background, there is a large, bright light source, possibly a laser or a powerful lamp, which creates a strong blue and white glow. The overall scene is dimly lit, with the primary light source being the bright beam of light.

Thank you!

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