2019 Generic Small-size Automated Driving System (ADS) Vehicle

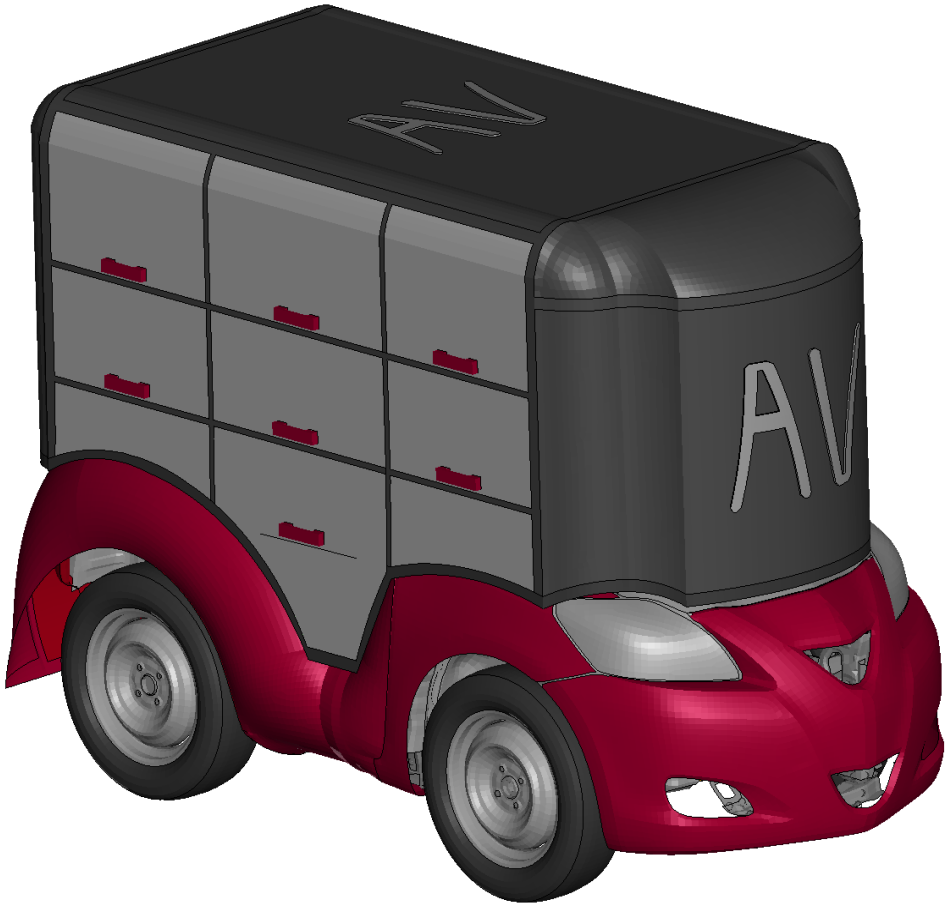
Finite Element Model Development

doi:10.13021/harc-m265

Vehicle Description

- GMU-CCSA-GENERIC-SMALL-SIZE-ADS-VEHICLE-V1.key
- Small Size Automated Driving System (ADS) Vehicle
- Weight: 773 kg
- Finite element model derived from a validated 2010 Toyota Yaris FE model (doi: 10.13021/G8JS5D)
- Dimensions similar to existing small ADS vehicle concepts
- Resulting generic small ADS vehicle FE model was NOT validated against test data

Model Information

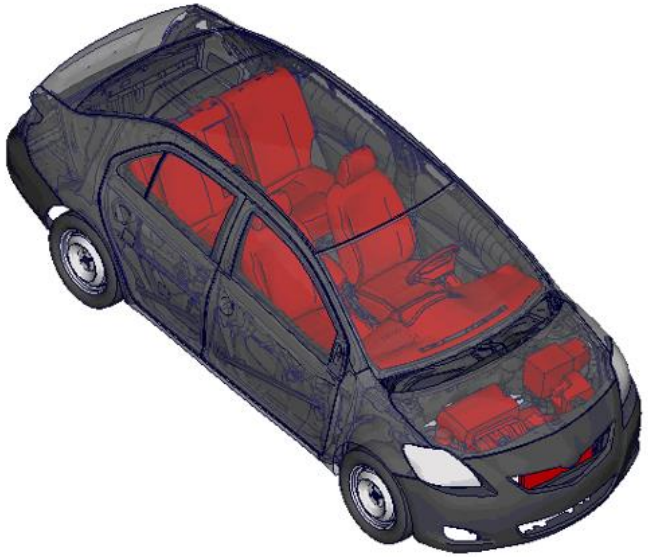


Number of parts	319
Number of nodes	220478
Number of solid elements	31458
Number of shell elements	179798
Number of beam elements	1231
Number of elements	212487
Model units	mm, s, t, N
Release date	Nov. 2019

Example of an existing small ADS vehicle concept

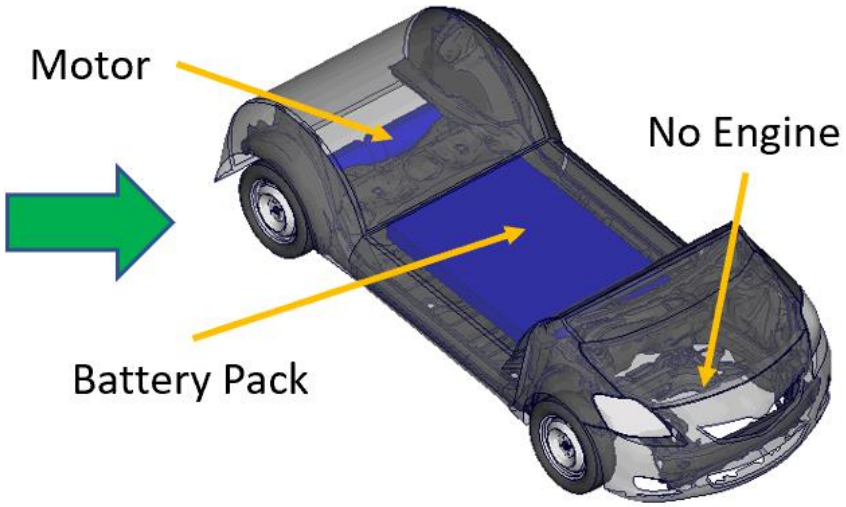
www.nuro.ai

Model Development



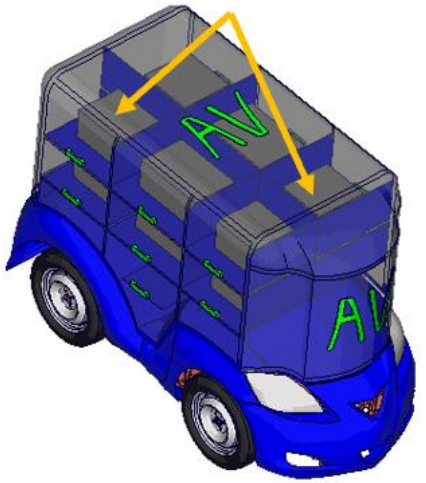
Existing FE Model

No seats, interior, trunk, and occupant compartment



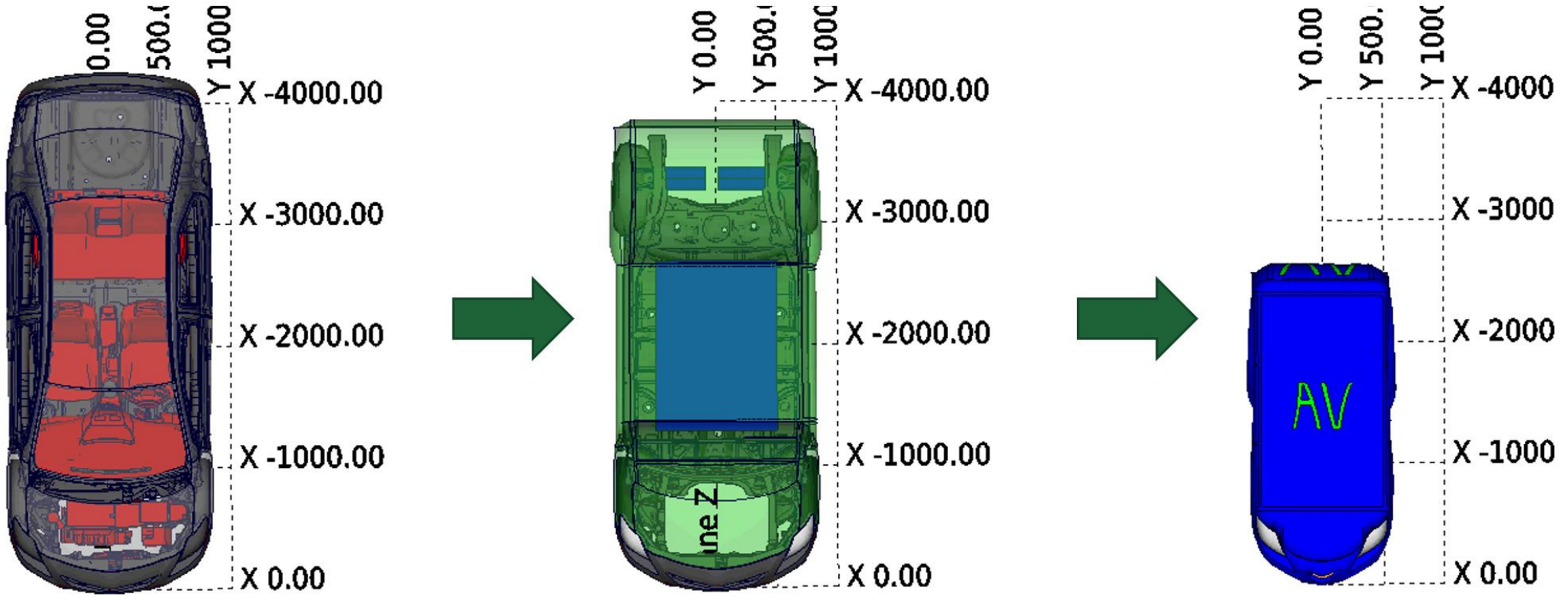
"Skateboard-type" chassis

Optional Cargo

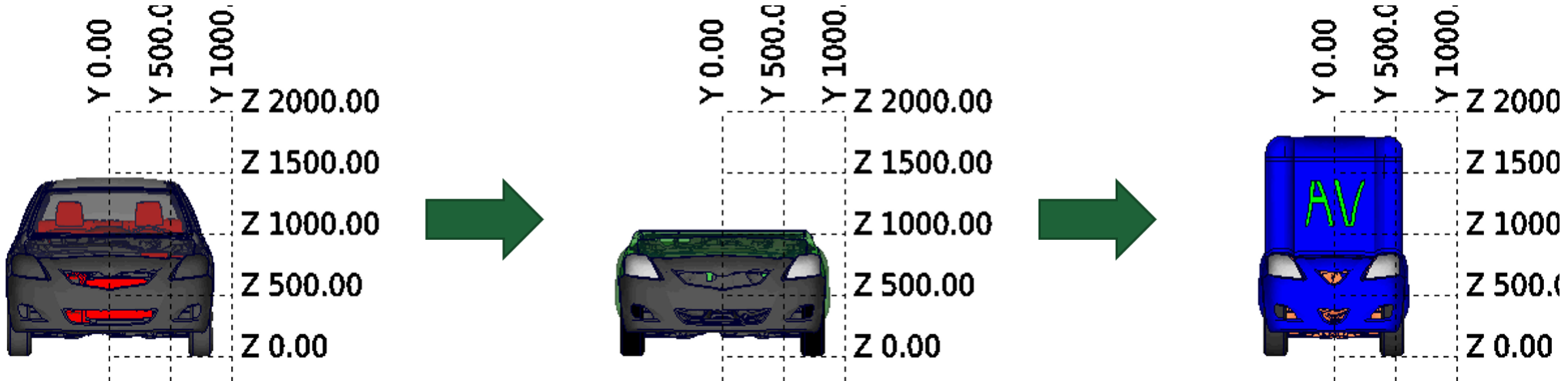


Generic ADS Model
Chassis + Body

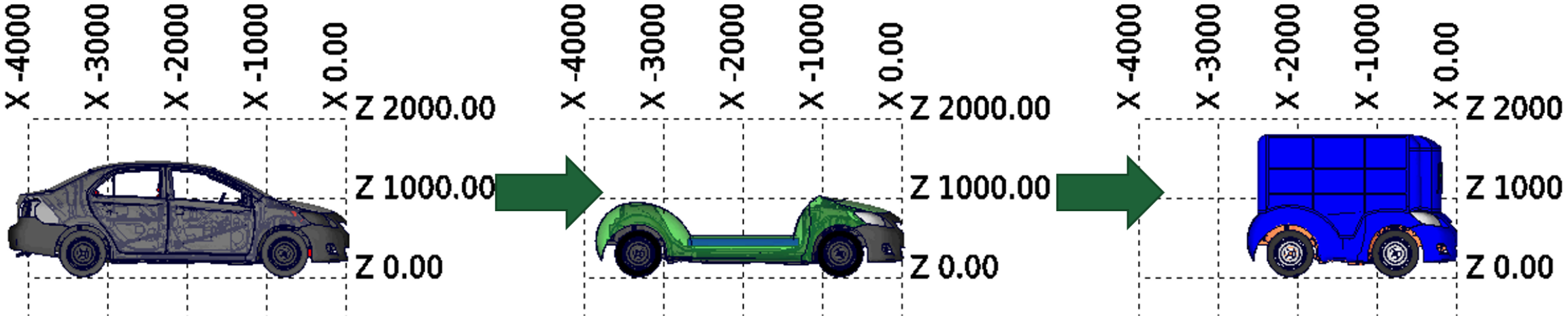
Model Dimensions – Top View



Model Dimensions – Front View

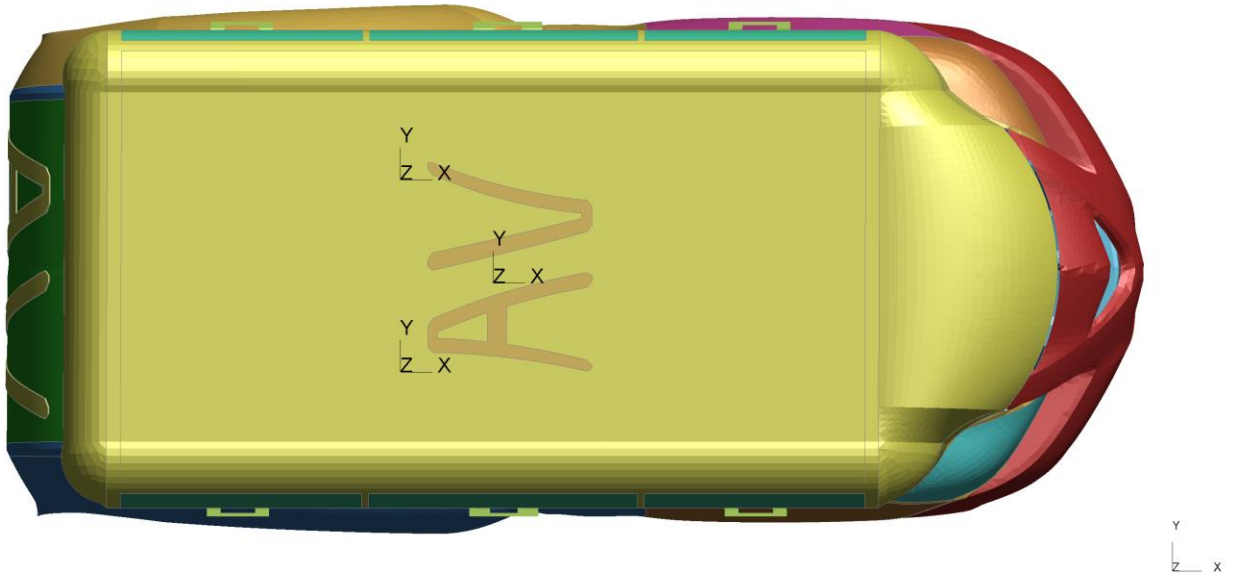


Model Dimensions – Side View

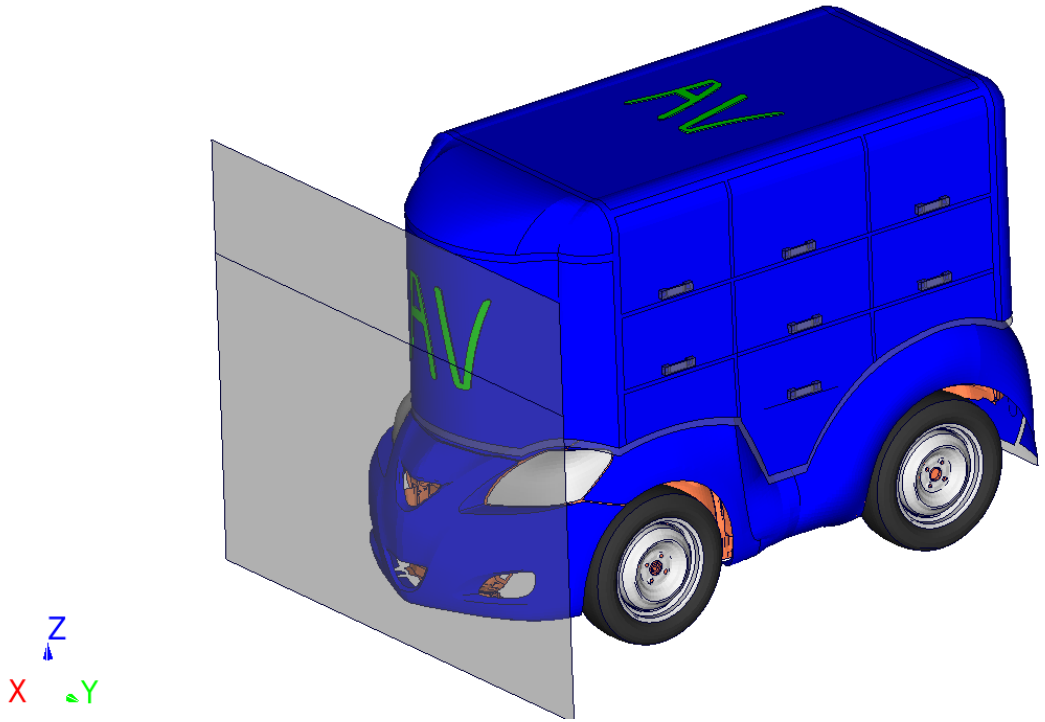


Accelerometers

- Vehicle C.G. Local (Node 2393289)
- Vehicle C.G. Global (Node 2393287)
- Left Rear Seat (Node 2393273)
- Right Rear Seat (Node 2393281)

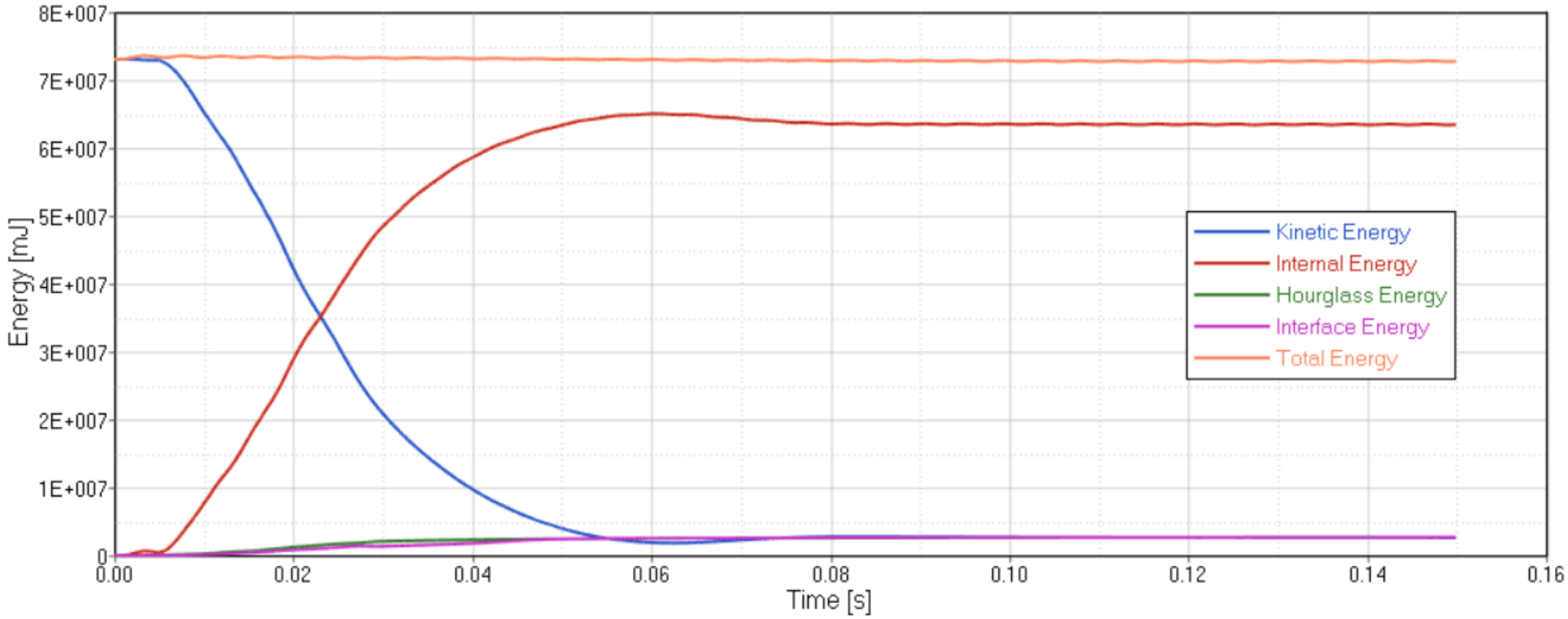


Simulation Benchmark

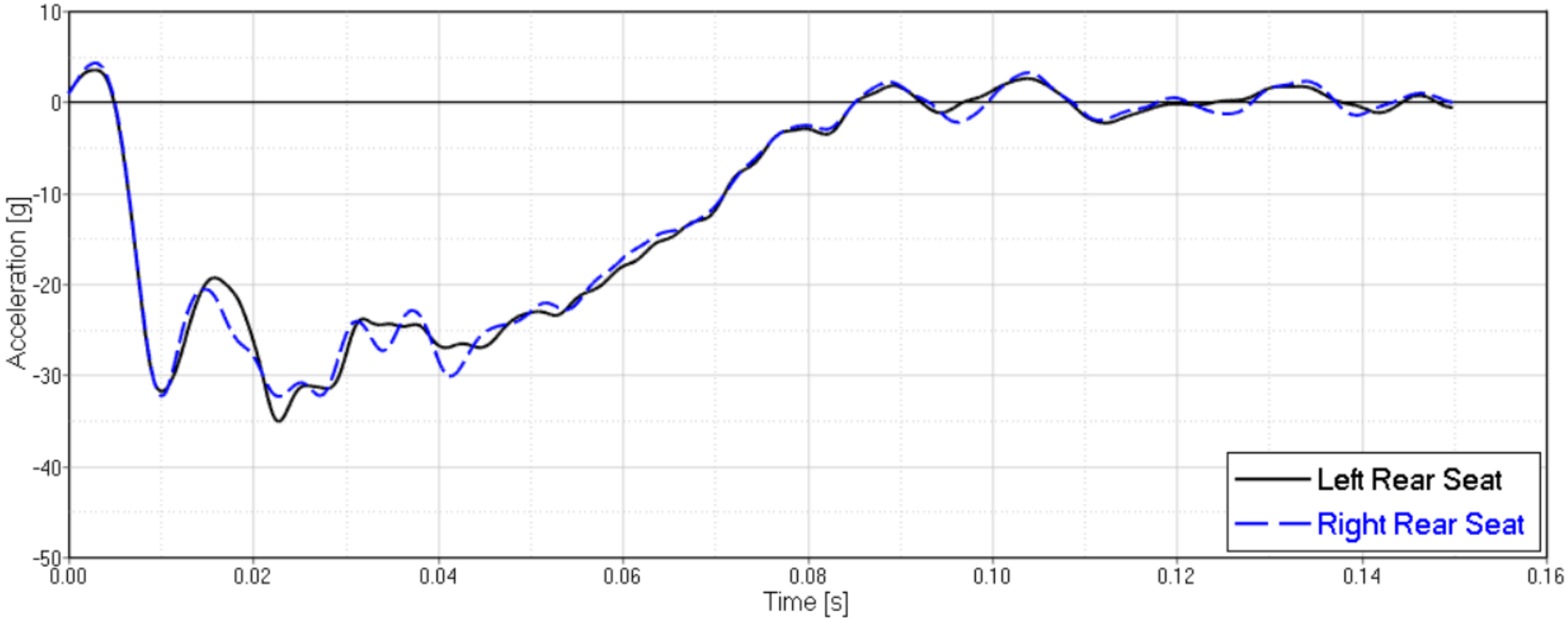


LS-DYNA	
Platform	Linux RHEL 5.4
Version	MPP s R9.3.0
Revision	128342
Precision	Single precision (I4R4)
Turn around time (150ms)	33 minutes
Number of processors	16

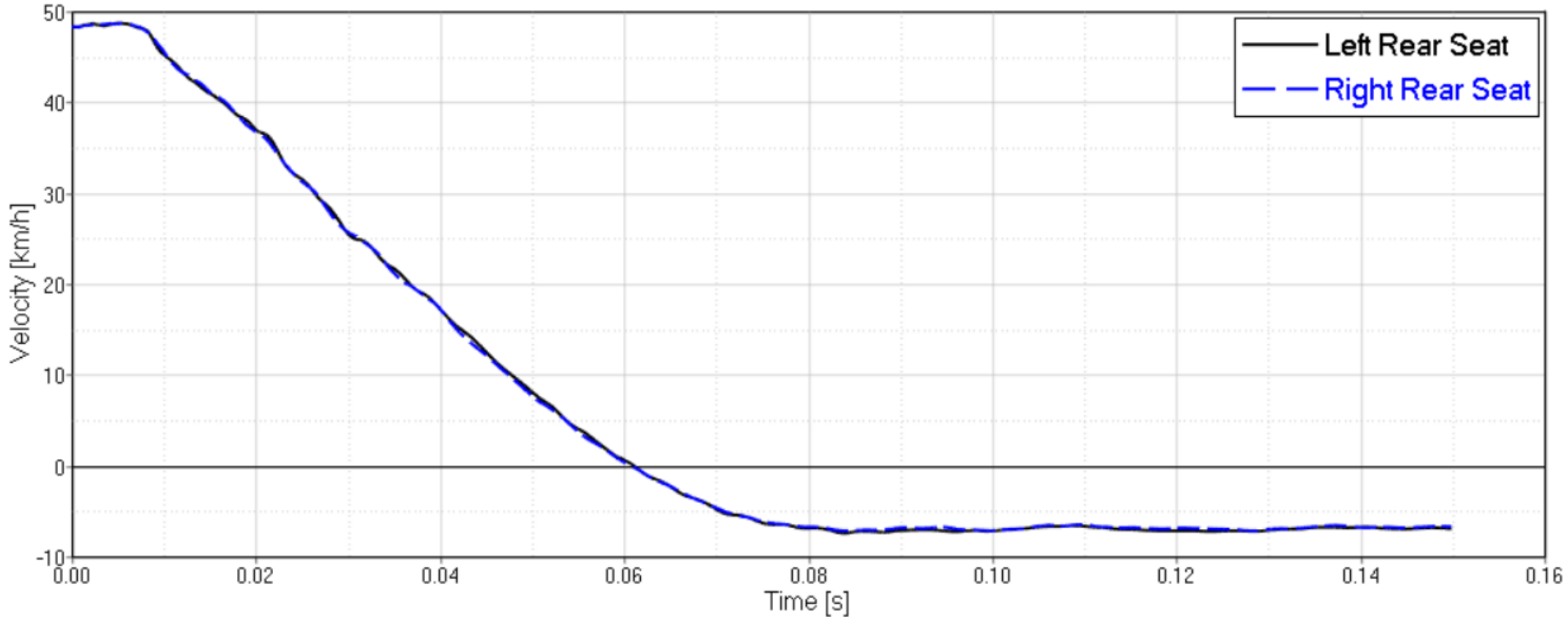
Full Frontal Impact – 48 km/h – Energy Summary



Full Frontal Impact – 48 km/h – X-Acceleration



Full Frontal Impact – 48 km/h – X-Velocity



Full Frontal Impact – 48 km/h – Force vs. Displacement