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

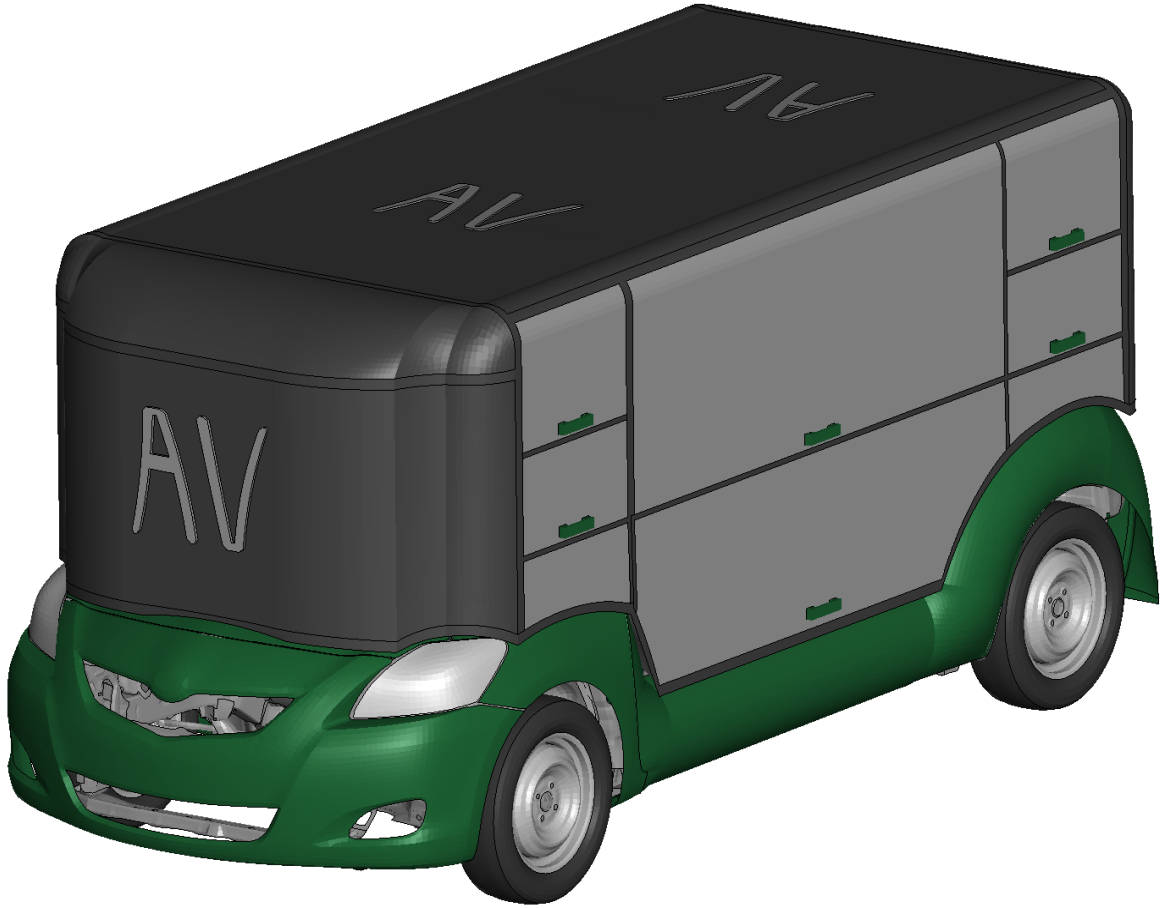
Finite Element Model Development

doi:10.13021/gfg4-8w64

Vehicle Description

- GMU-CCSA-GENERIC-MID-SIZE-ADS-VEHICLE-V1.key
- Mid-size Automated Driving System (ADS) Vehicle
- Weight: 1445 kg
- Finite element model derived from a validated 2010 Toyota Yaris FE model (doi: 10.13021/G8JS5D)
- Dimensions similar to existing mid-size ADS vehicle concepts
- Resulting generic mid-size ADS vehicle FE model was NOT validated against test data

Model Information



Number of parts	371
Number of nodes	456453
Number of solid elements	155703
Number of shell elements	281443
Number of beam elements	2157
Number of elements	439303
Model units	mm, s, t, N
Release date	Nov. 2019

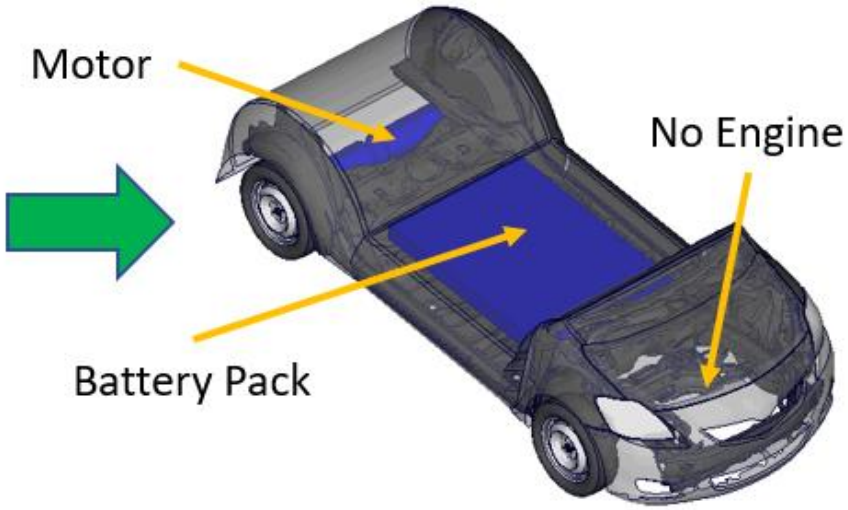
Example of an existing mid-size ADS vehicle concept

mercedes-benz-vision-urbanetic-self-driving-electric-concept-design

Model Development

Existing FE Model

No seats, interior, trunk, and occupant compartment

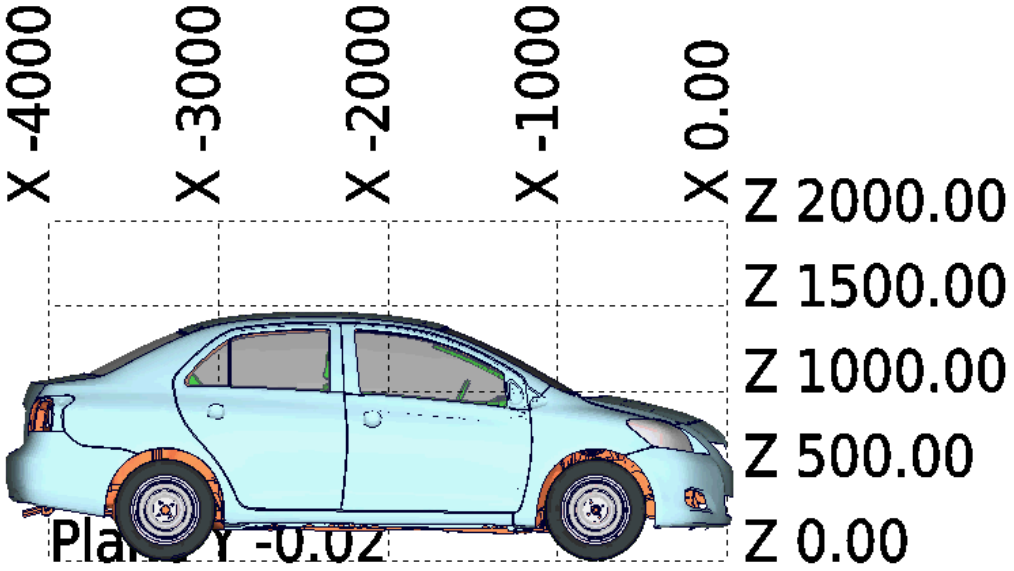


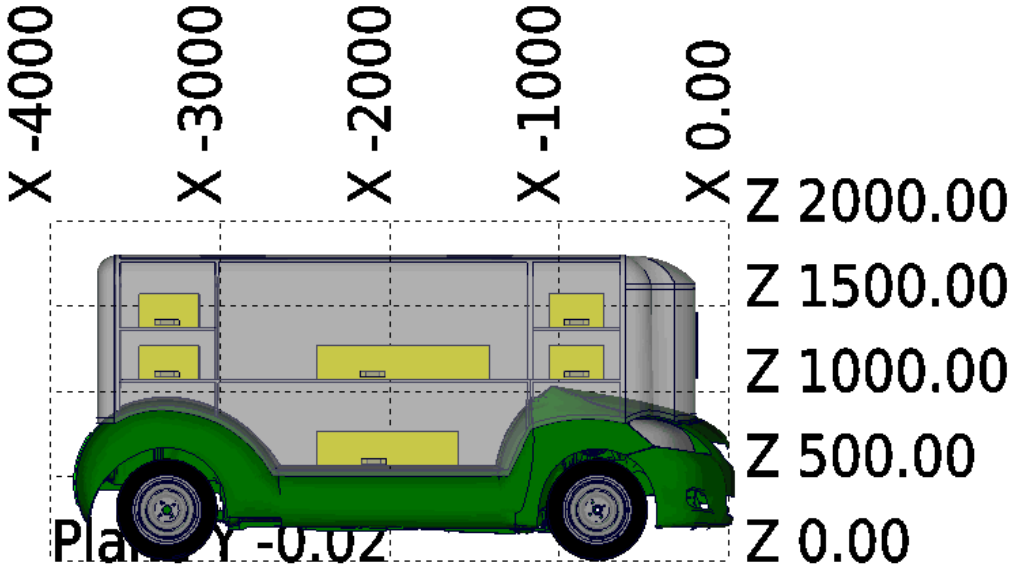
"Skateboard-type" chassis

Optional Cargo

Generic ADS Model
Chassis + Body

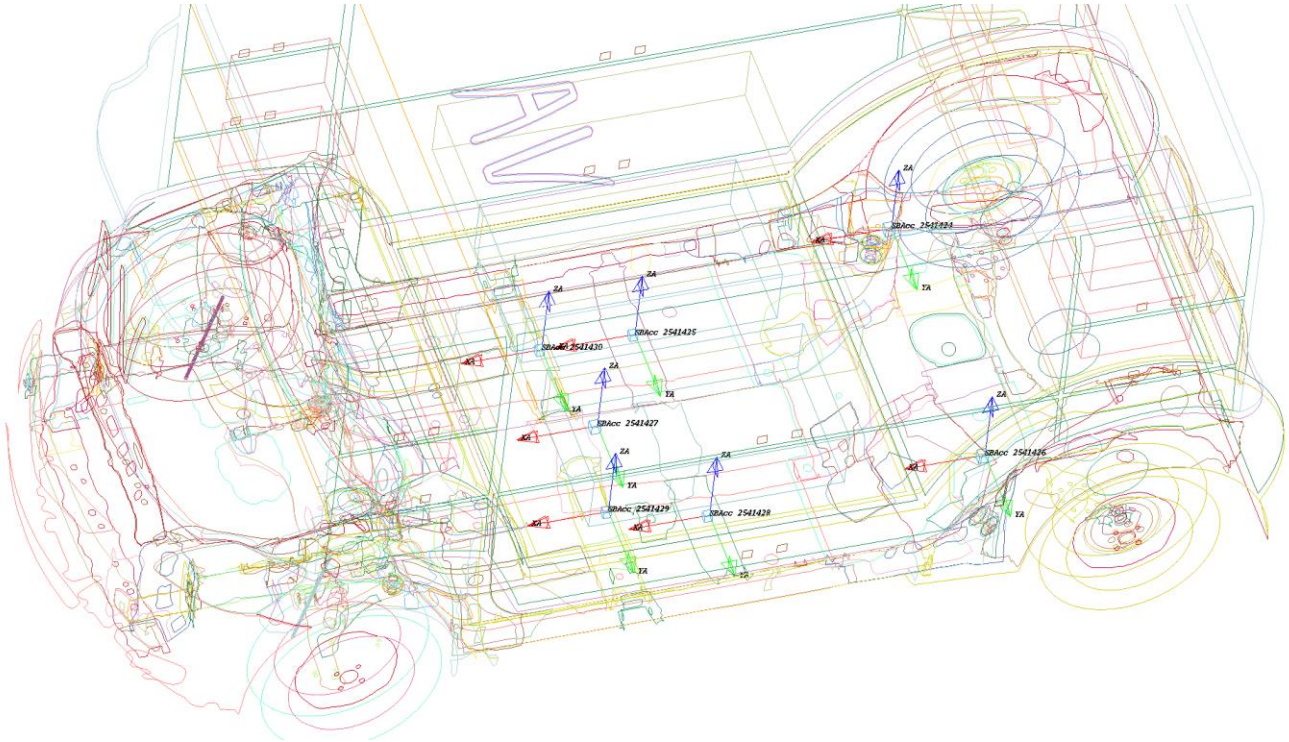
Model Dimensions – Side View



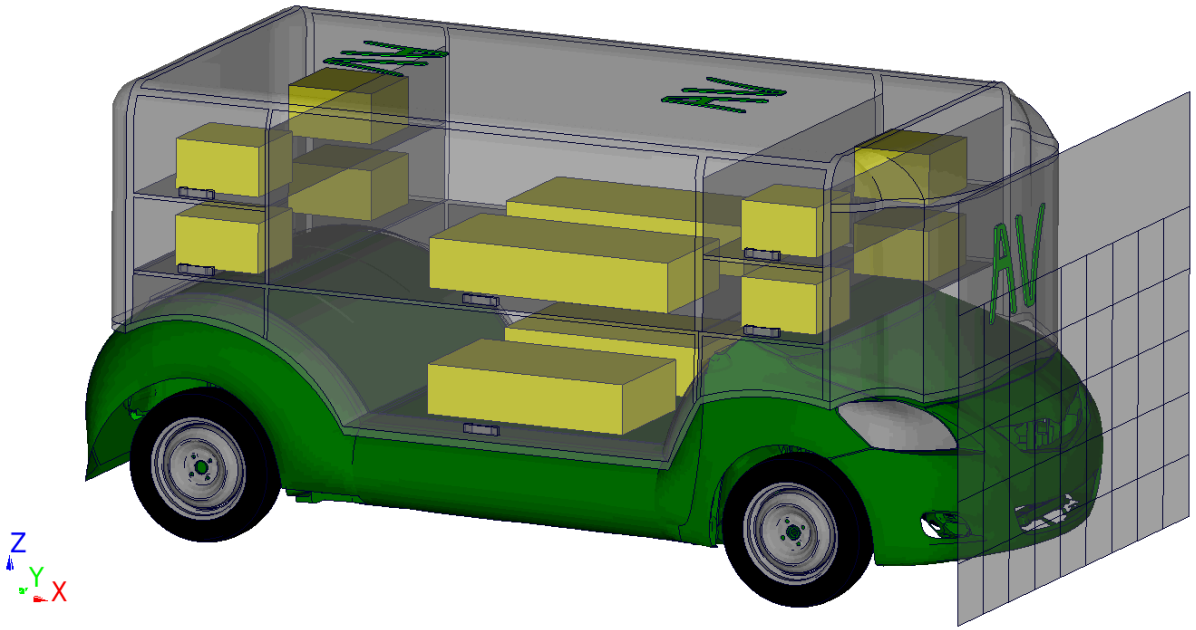


Accelerometers

- Left Rear Seat (Node 2241532)
- Right Rear Seat (Node 2241540)
- Vehicle C.G. Local (Node 2241548)
- Vehicle C.G. Global (Node 2241546)
- Driver Seat X-member (Node 2241552)
- Passenger Seat X-member (Node 2241557)
- Driver Seat Front (Node 2241568)
- Passenger Seat (Node 2241573)

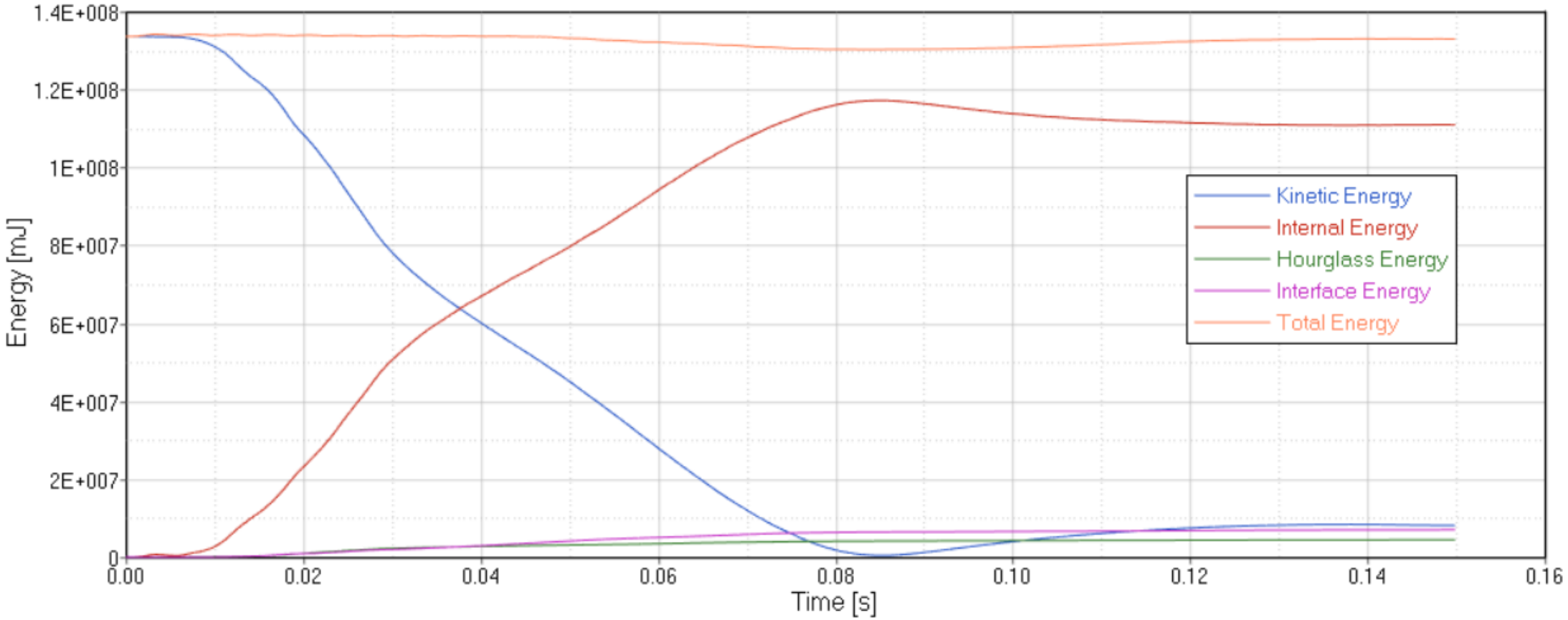


Simulation Benchmark

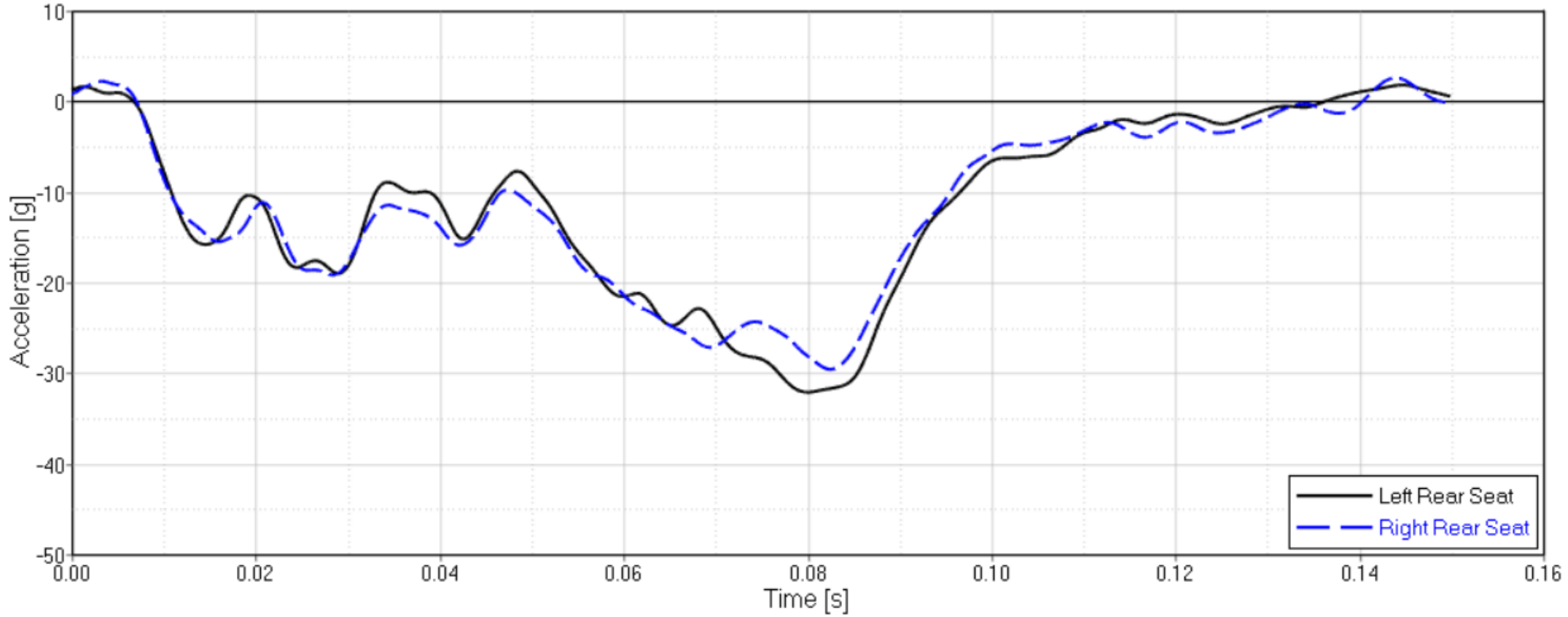


LS-DYNA	
Platform	Linux RHEL 5.4
Version	MPP s R9.3.0
Revision	128342
Precision	Single precision (I4R4)
Turn around time (150ms)	1 hour 16 minutes
Number of processors	16

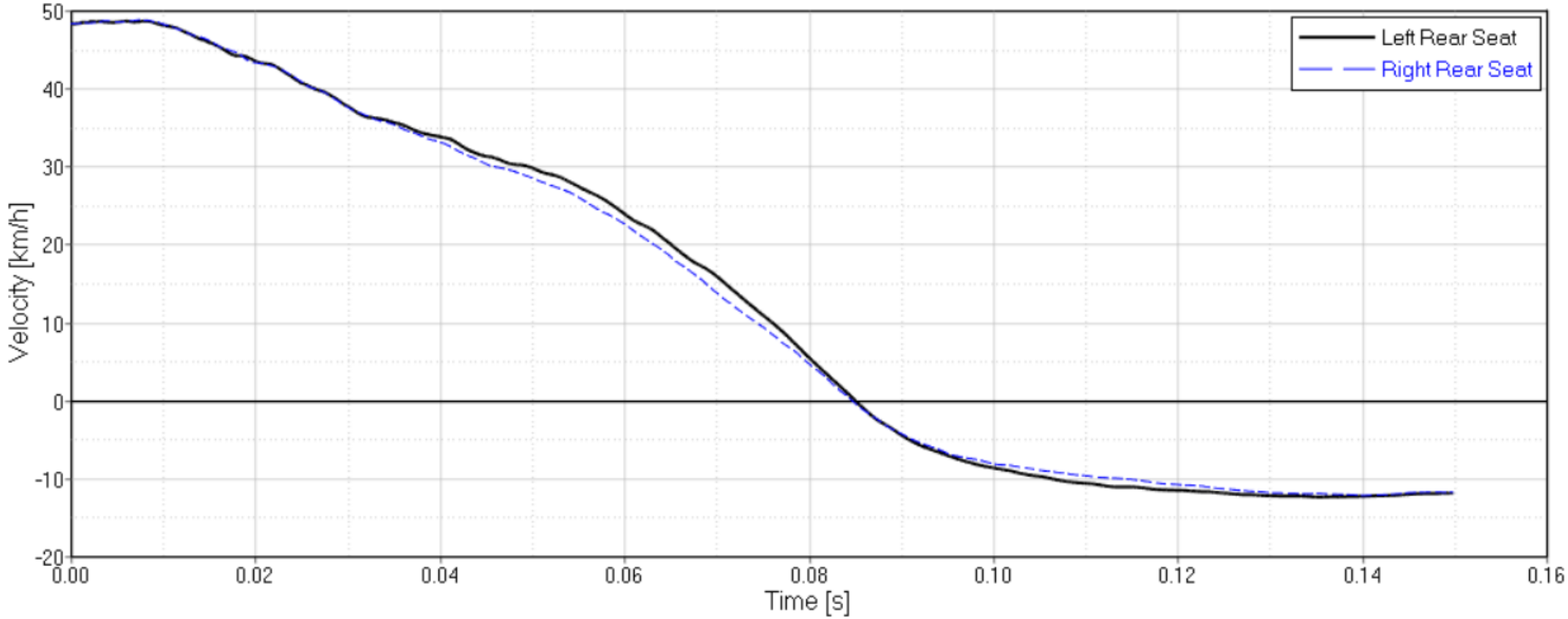
Full Frontal Impact – 48 km/h – Energy Summary



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