



# Update: Deceleration pulse corridor for AECD testing

Matthias Seidl

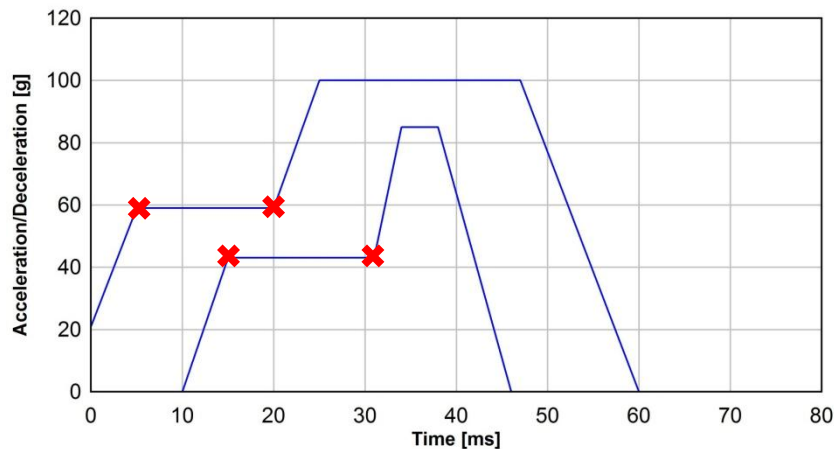
31 March–02 April 2015



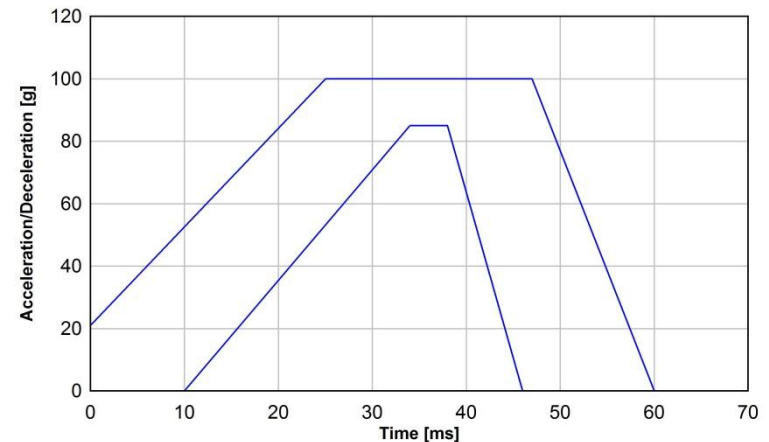
# Simplifying the proposed corridor

- At the 7<sup>th</sup> AECS meeting TRL presented a proposed deceleration corridor based on full-width impact tests (AECS-07-05, Page 14)
- Following feedback from the experts the shape of the proposed corridor was simplified:
  - Four points deleted (B, C, H and I)
  - All other points identical: Same peak deceleration levels and duration

AECS 7 proposal:

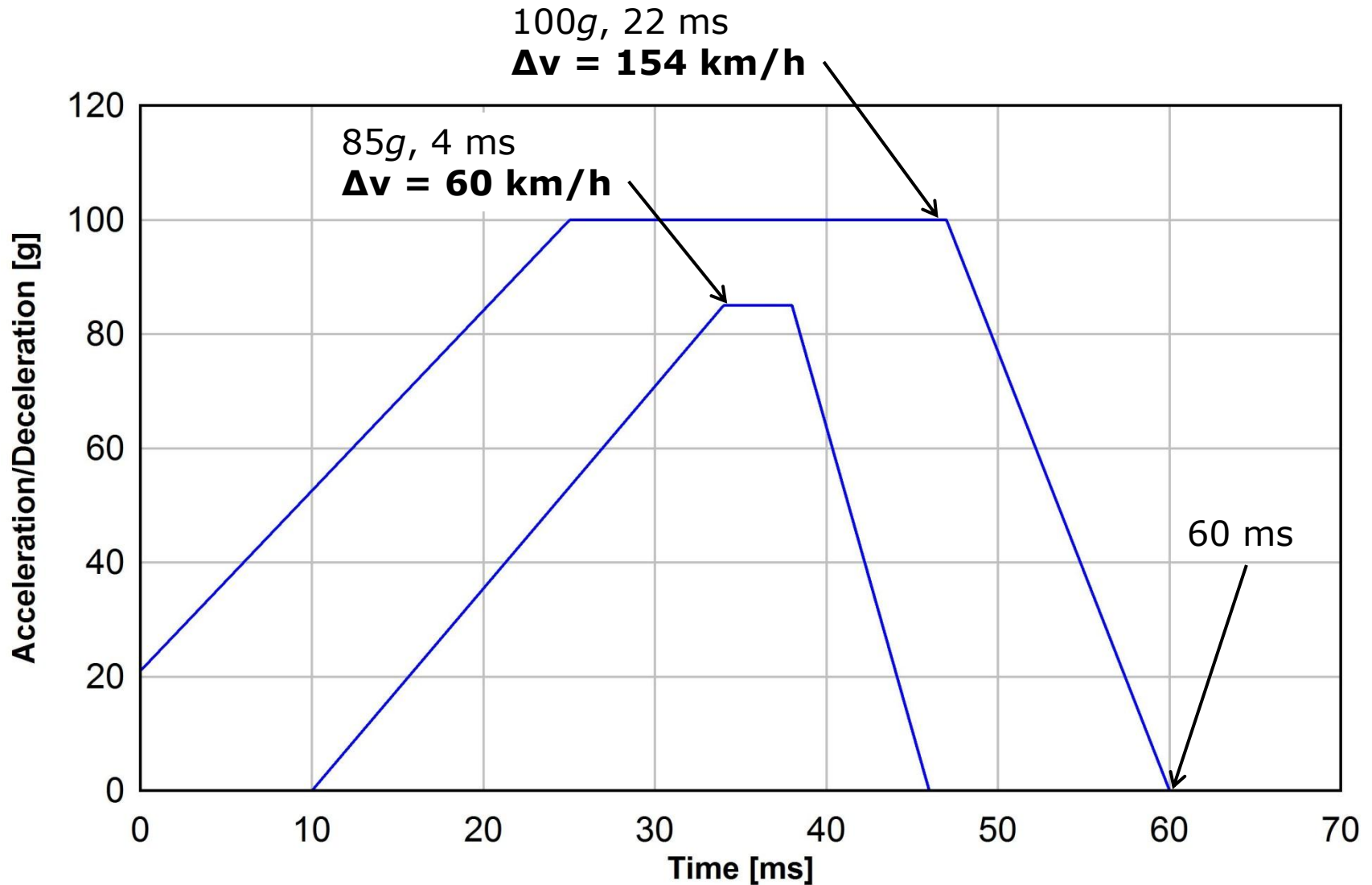


AECS 8 proposal (simplified):



- Simplified corridor enables easier replication of pulse with existing test sleds

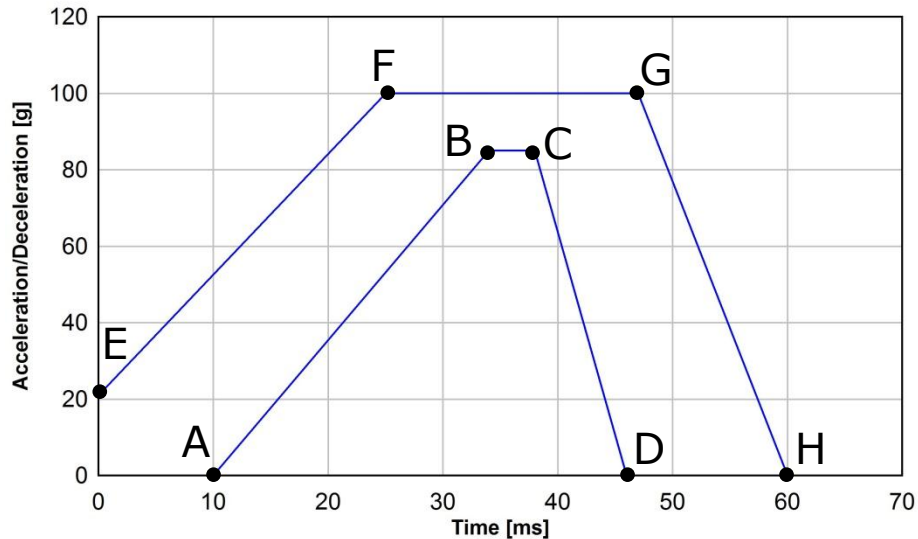
# Proposed Deceleration Corridor (simplified)



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## Proposed Deceleration Corridor

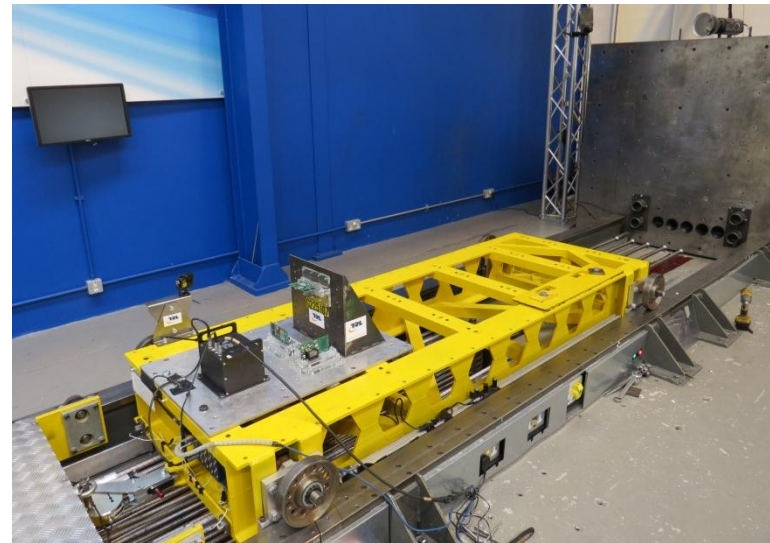
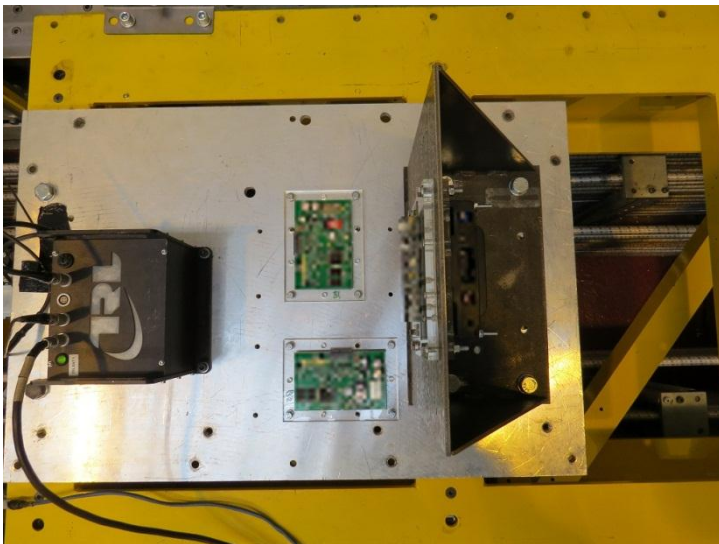
Based on 56 km/h, rigid barrier, full-width impact tests, safety factor 1.3, simplified shape



Point	Time (ms)	Deceleration (g)
<b>A</b>	10	0
<b>B</b>	34	85
<b>C</b>	38	85
<b>D</b>	46	0
<b>E</b>	0	21
<b>F</b>	25	100
<b>G</b>	47	100
<b>H</b>	60	0

# Sled testing of telematics units: Setup

- TRL performed sled testing using the simplified pulse corridor
- Sled specification: Deceleration sled; 230 kJ maximum energy; 12 bungees; 1.8 metres free run
- Vehicle telematics units (containing GSM and GNSS modules, SIM card holders, internal batteries, capacitors, etc.) were used as a substitute AECD units
- 4 test runs with 12 samples (4 different unit designs, 3 samples of each)



*TRL thank Stadium United Wireless for providing test samples and support for this programme.*

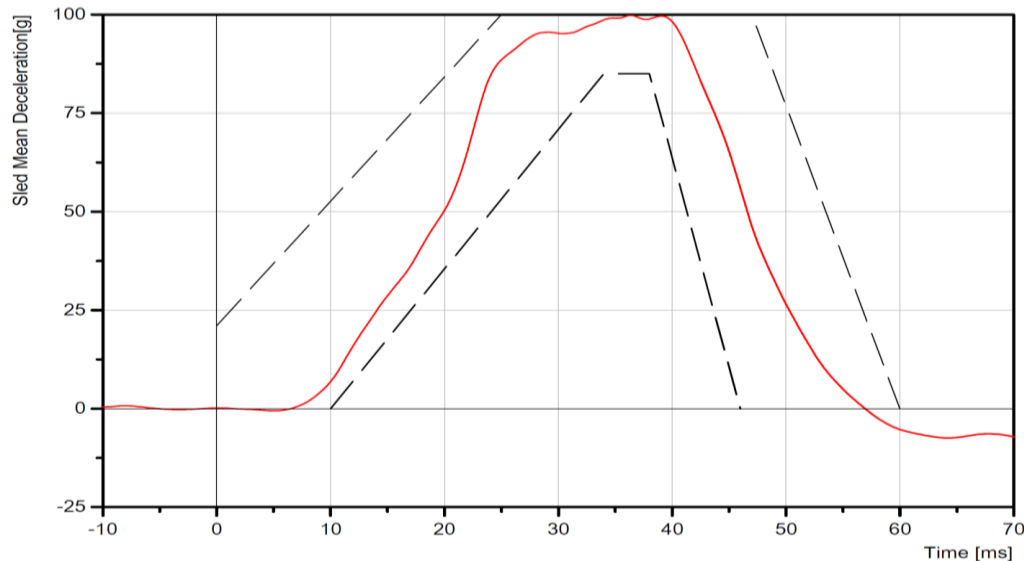
# Sled testing of telematics units: Results

- Proposed deceleration levels were achieved easily
- Peak decelerations were between 98 *g* and 104 *g*

Example trace of TRL test G225I11:



Test Number: G225I11; Test Type: Pulse 3; Date: 10/03/2015  
Customer: TRL;  
Test Description: Unit C, Pulse 3



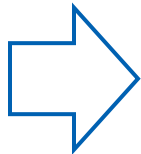
$\Delta v$ : 99.0 km/h  
Peak deceleration: 99.8 *g*

- The units were inspected post-test both, visually (for bent, displaced or lifted-off components) and electronically (current consumption, GPS/GSM functionality)
- All 12 samples of telematics units passed the inspections, i.e. remained operable after being subjected to the proposed deceleration pulse.



# Conclusions

- The proposed maximum deceleration of circa 100 *g* was achieved without issues on an existing standard deceleration sled.
- The proposed pulse corridor was wide enough to achieve a valid deceleration pulse with limited effort for pulse-tuning.
- The test setup used allowed the number of sled tests required to be minimised: Three orientations of each system were tested simultaneously.
- All 12 samples of telematics units tested proved able to withstand the test deceleration pulses of circa 100 *g*.



**This shows that the proposed deceleration corridor can be replicated easily and AECU control units should be able to withstand it.**

# **Thank you**

**Update: Deceleration pulse corridor for  
AECD testing**

**AECS 8<sup>th</sup> meeting  
31 March–02 April 2015**

Matthias Seidl  
Tel: +44 1344 770549  
Email: [mseidl@trl.co.uk](mailto:mseidl@trl.co.uk)







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