Progress on acceleration accuracy validation

CATARC

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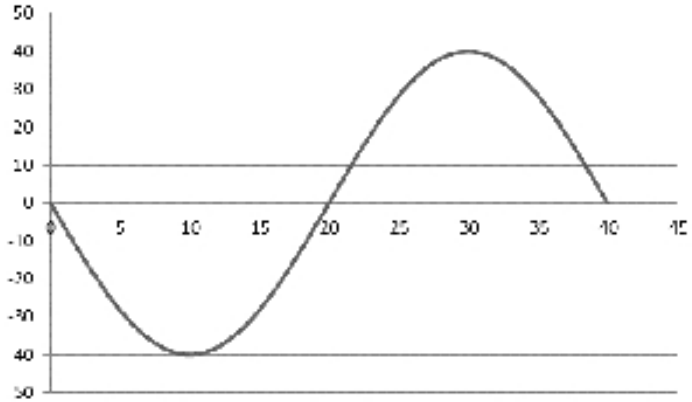
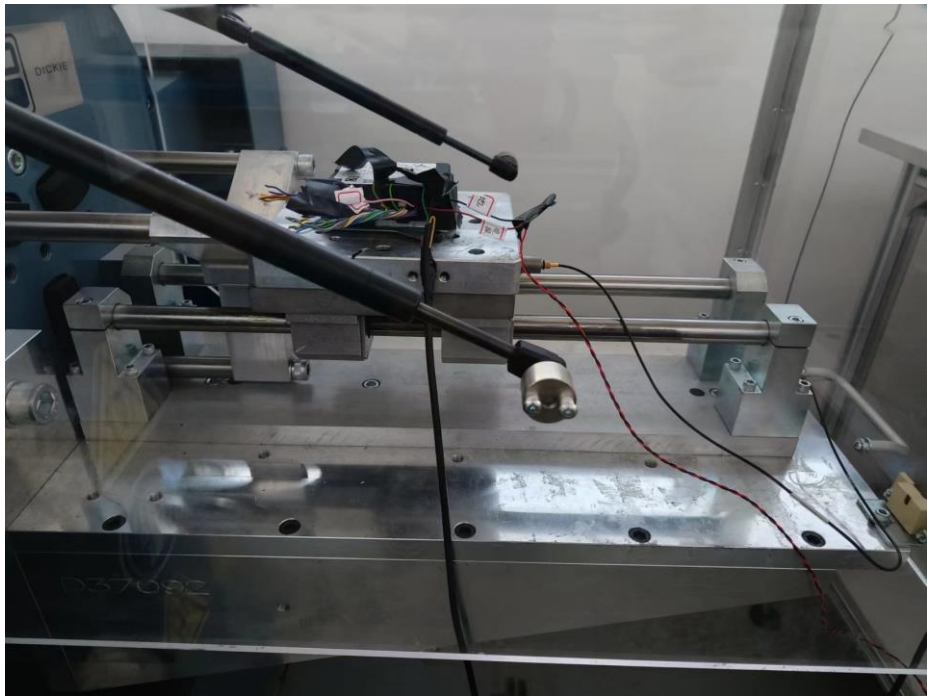
Bench test

❖ Accuracy is one of the indispensable data for the report (even we already have Delta-V).

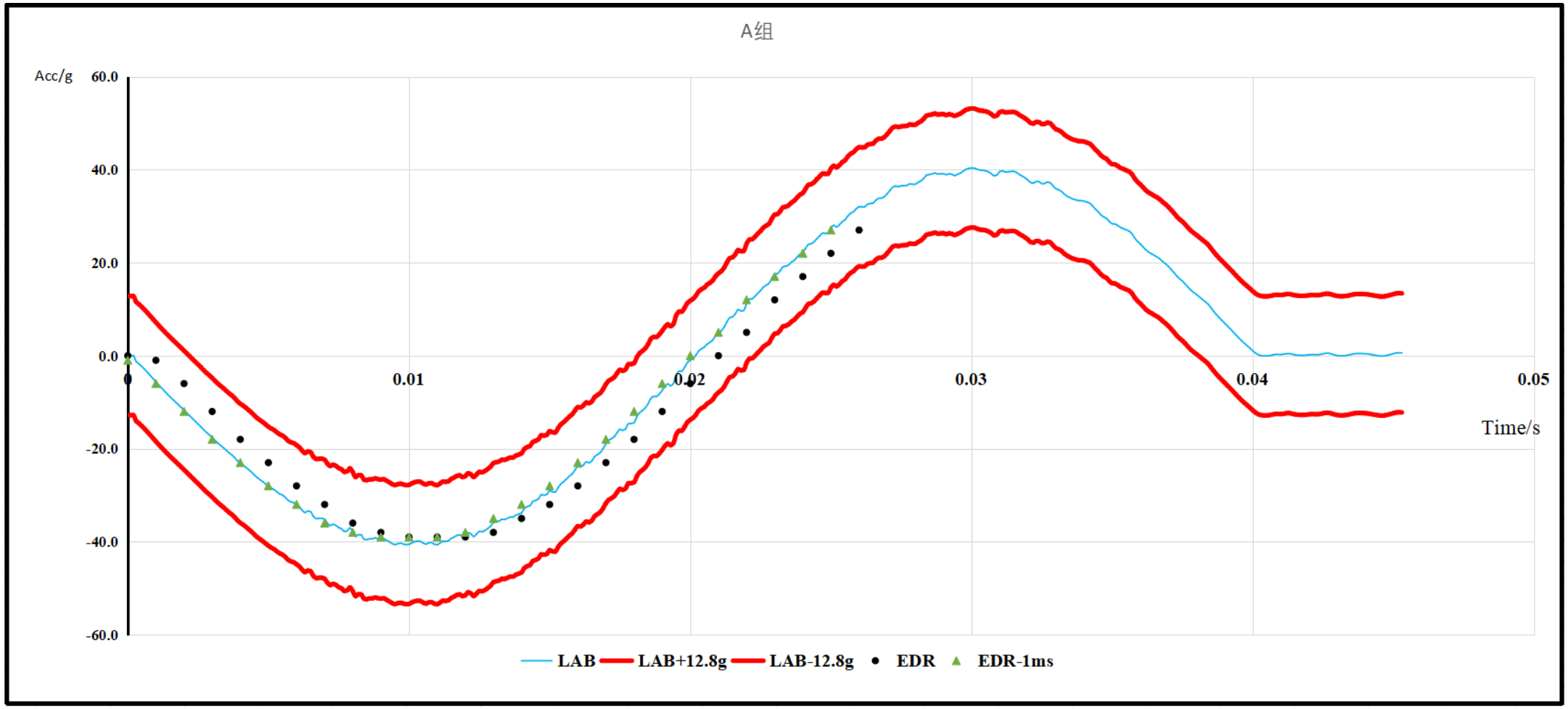
- **In order to validate the acceleration accuracy, we designed a bench test.**
  - This waveform consists of a negative semi-sinusoidal and a positive semi-sinusoidal. (GB 39732-2020 Figure D.2)
  - Laboratory acceleration sensor :
    - Sampling Frequency 10kHz,
    - Range: ± 2000g





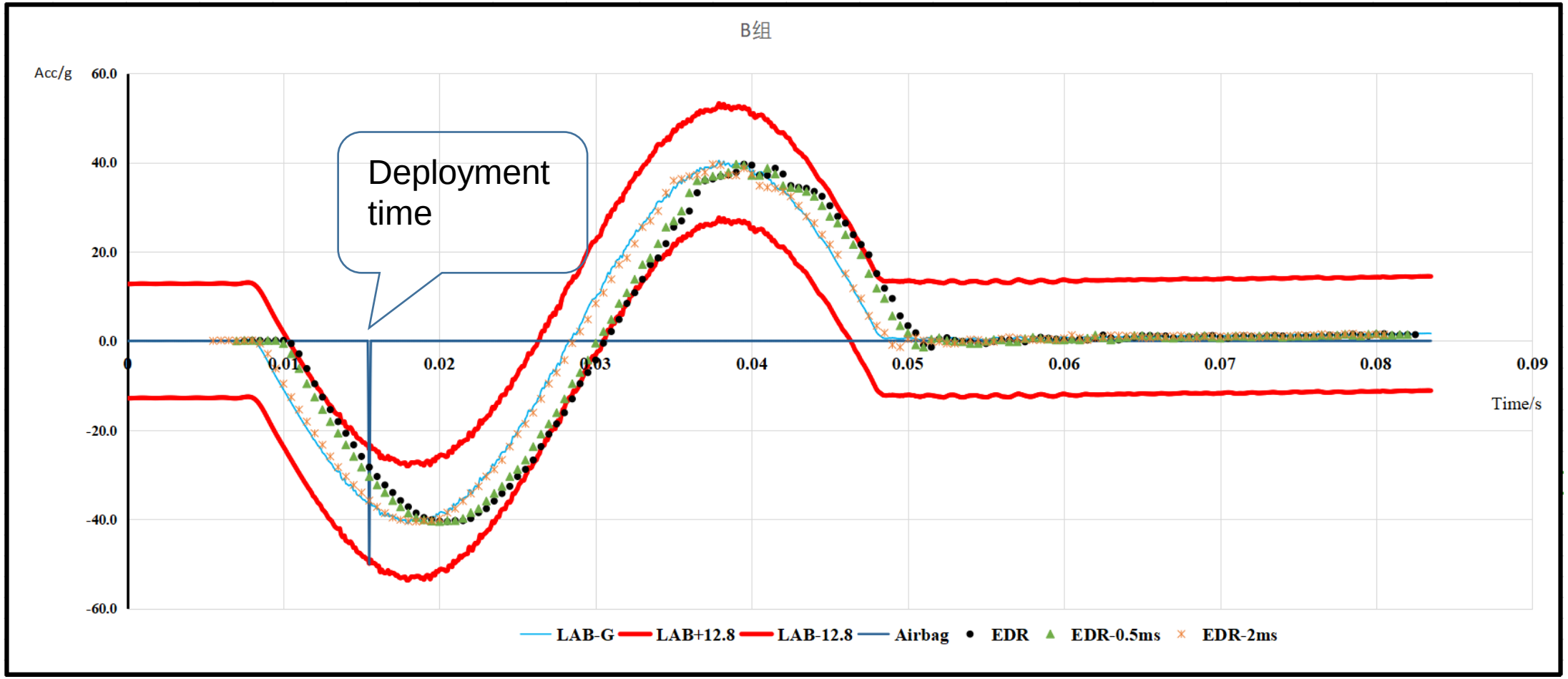
Sample A

- EDR acceleration sensor:
  - **Sampling Frequency 1kHz (Minium requirement 500Hz)**
  - **Range: ±128g**
  - **Alignment: -1ms**



Sample B

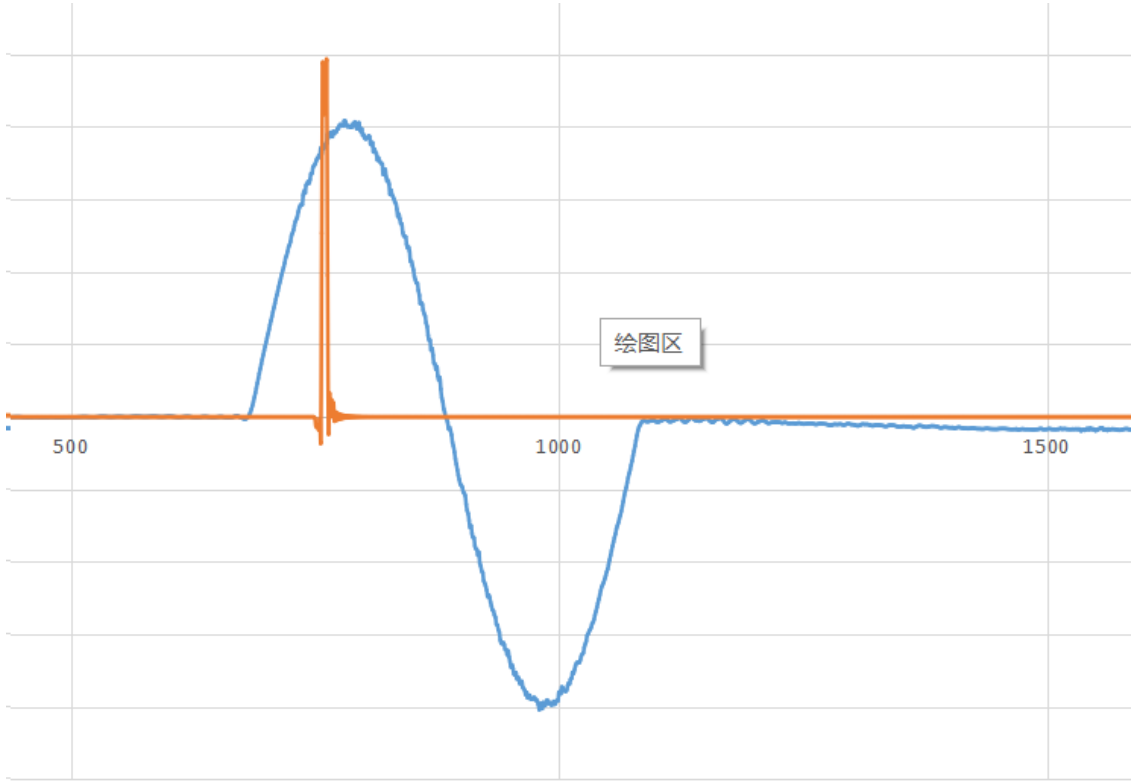
- EDR acceleration sensor:
  - **Sampling Frequency 2kHz (Minium requirement 500Hz)**
  - **Range: ±128g**
  - **Alignment: -0.5ms/-2ms**



Sample B-Alignment

Deployment Summary (Event 2)

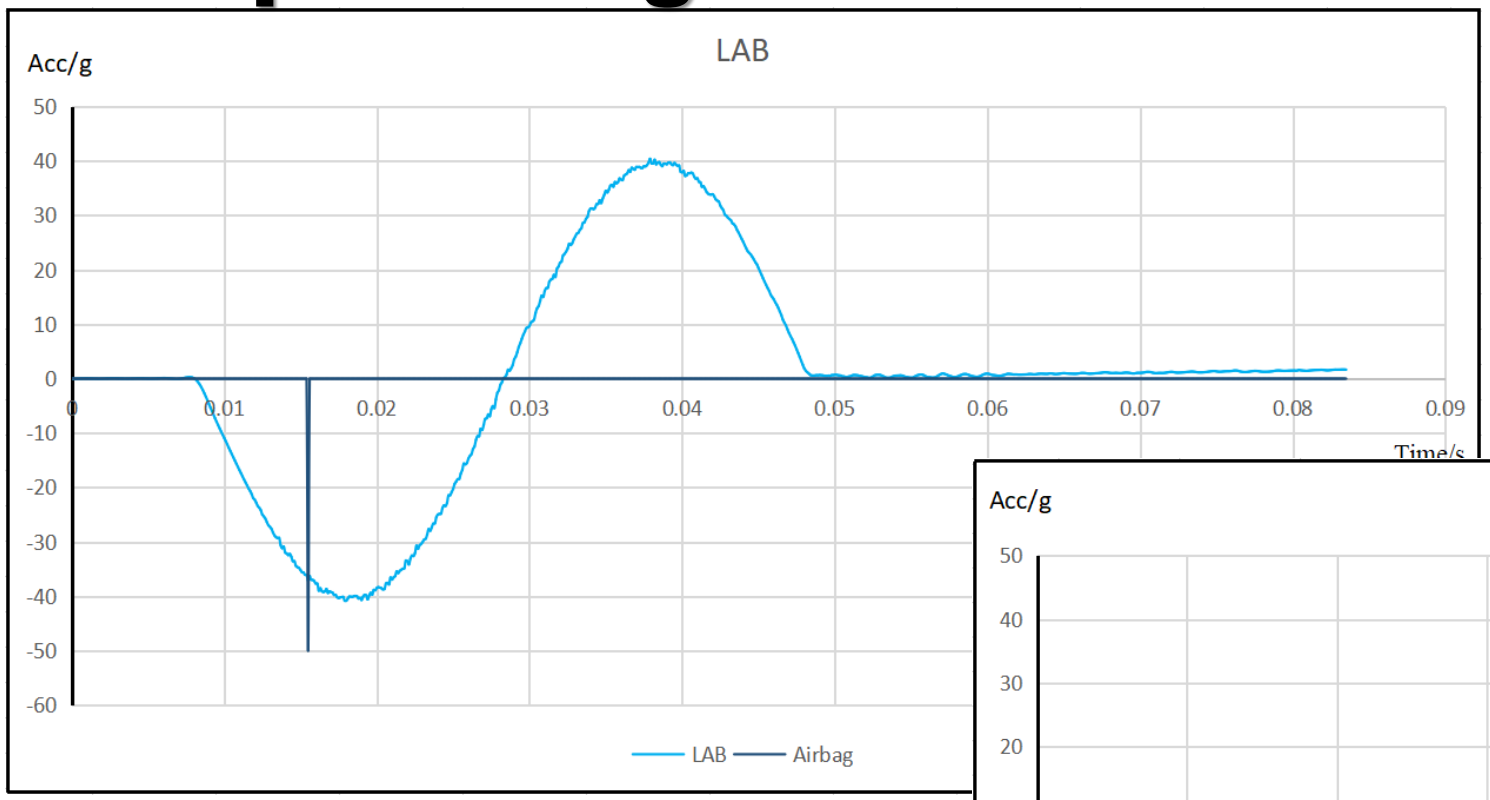
Device	Status	Deployment Command Time (ms)
Driver Front Airbag Stage 1	Deployment Commanded	3
Driver Front Airbag Stage 2	Deployment Not Commanded	
Driver Front Airbag Active Vent	Deployment Not Commanded	
Driver Knee Airbag	Not Configured	
Passenger Front Airbag Stage 1	Deployment Commanded	3
Passenger Front Airbag Stage 2	Deployment Commanded	8
Passenger Front Airbag Active Vent	Deployment Not Commanded	
Passenger Knee Airbag	Not Configured	

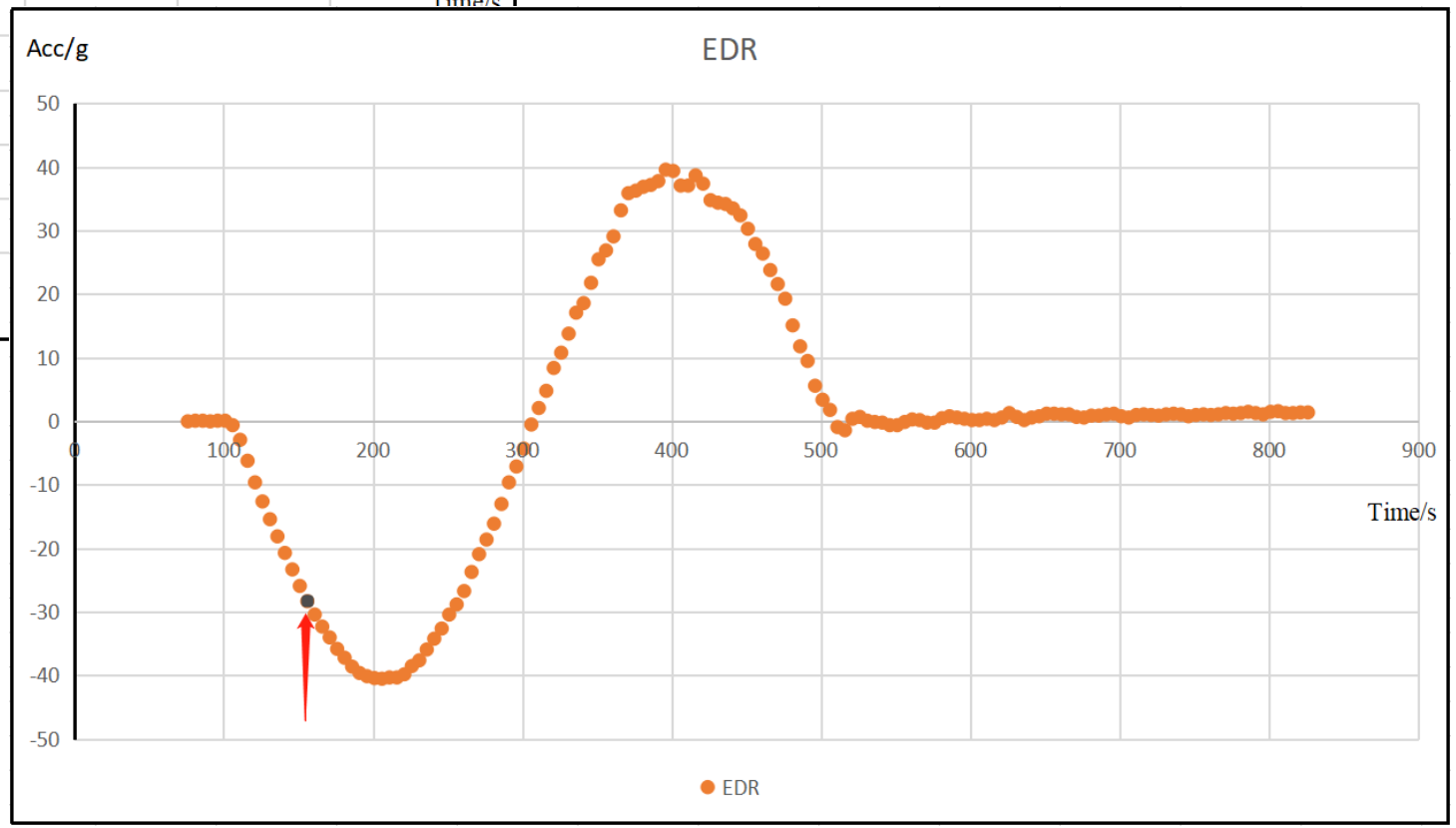


Longitudinal Acceleration Values (Eve

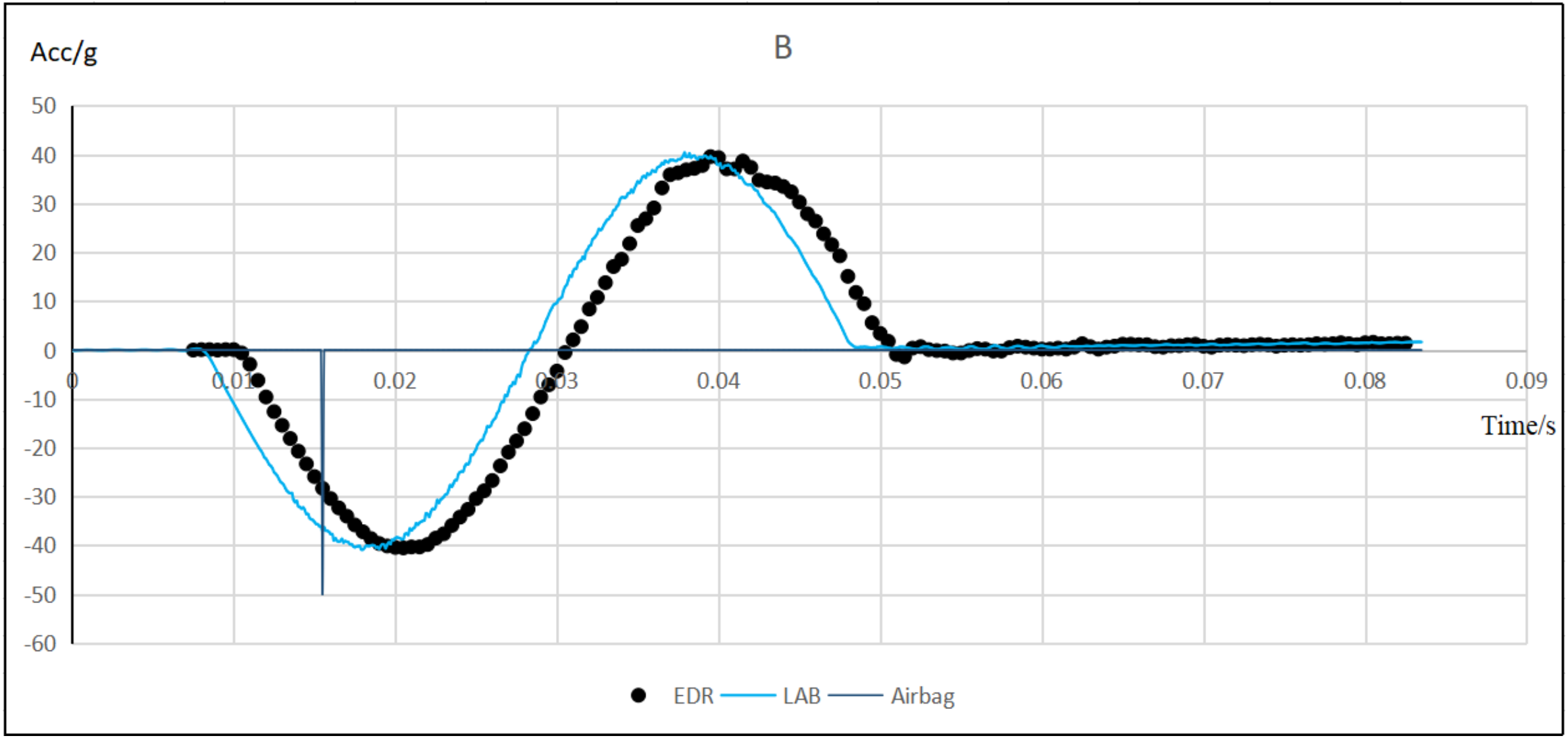
Time (ms)	Acceleration (g)
-5.0	0.0
-4.5	0.1
-4.0	0.1
-3.5	0.0
-3.0	0.1
-2.5	0.1
-2.0	-0.6
-1.5	-2.9
-1.0	-6.2
-0.5	-9.6
0.0	-12.6
0.5	-15.4
1.0	-18.1
1.5	-20.7
2.0	-23.3
2.5	-25.9
3.0	-28.3
3.5	-30.4
4.0	-32.3

Sample B-Alignment



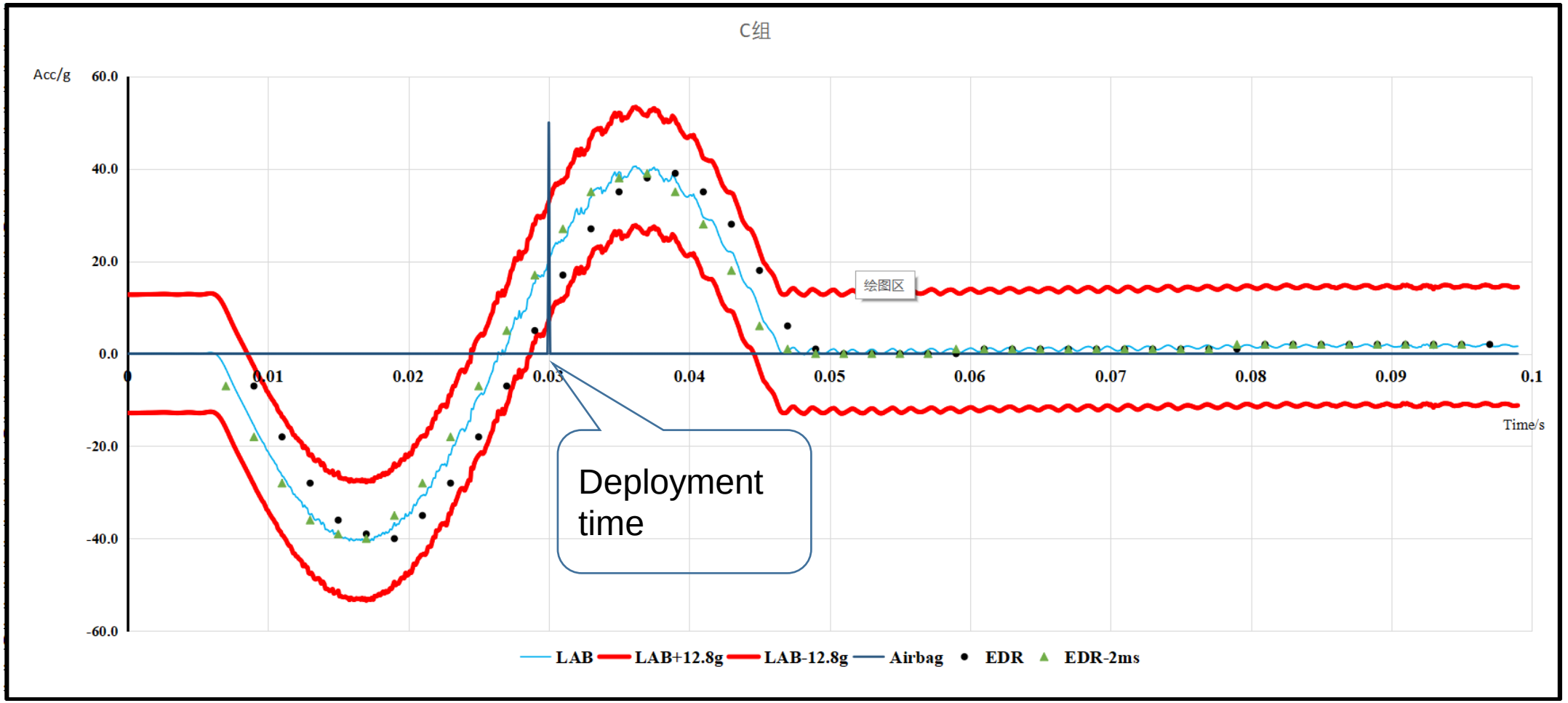


Sample B-Alignment



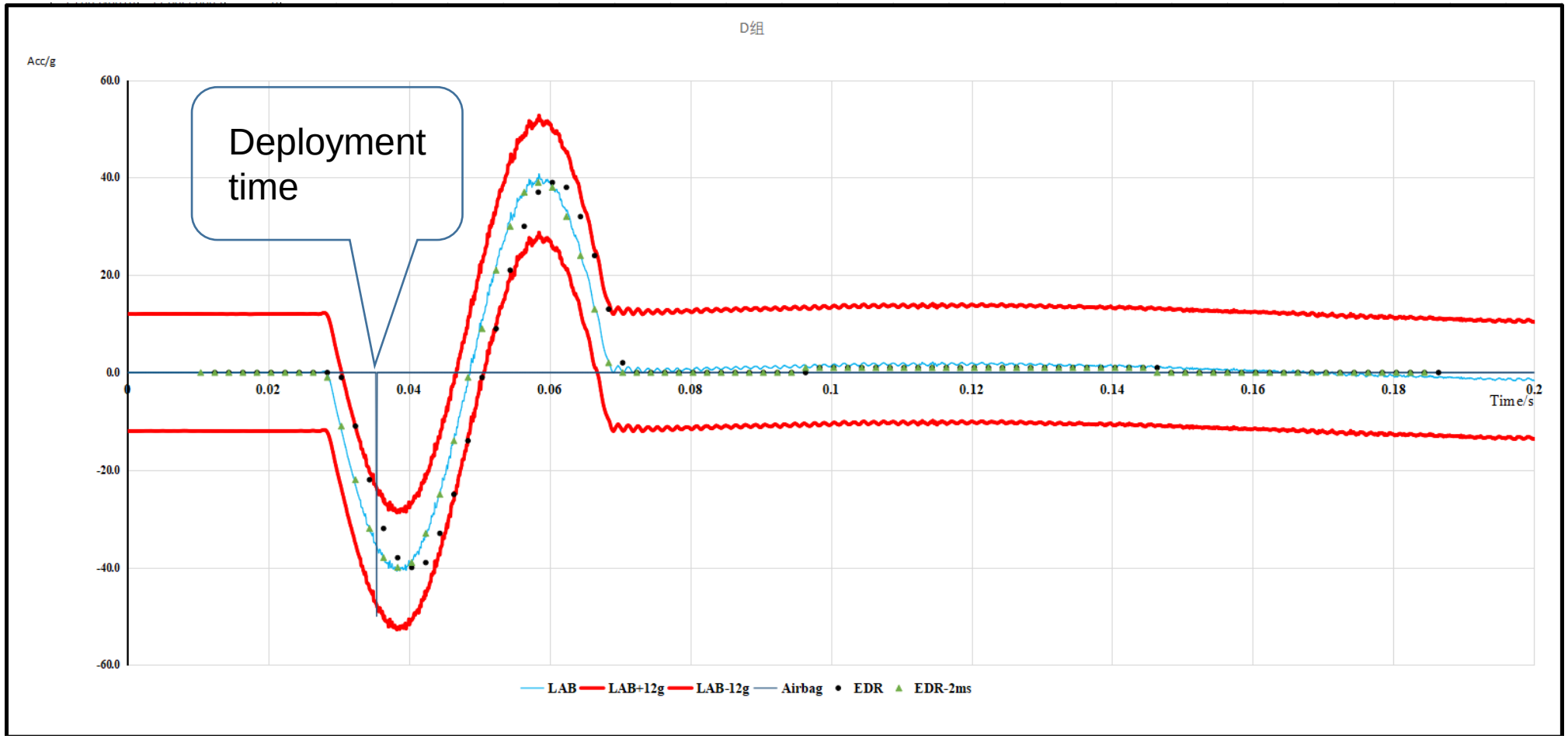
Sample C

- EDR acceleration sensor:
  - **Sampling Frequency 500Hz (Minium requirement 500Hz)**
  - **Range: ±128g**
  - **Alignment: -2ms**



Sample D

- EDR acceleration sensor:
  - **Sampling Frequency 500Hz (Minium requirement 500Hz)**
  - **Range: ±120g**
  - **Alignment: -2ms**



Suggestions

To verify the acurracy of acceleration, we sugget testing method into Guidance or R160.

1. Make alignment of EDR data and Lab data according to deployment time.
2. Shifting shall be considered because of the time aberration:
   —Shifting range: -2ms~+2ms（the sampling rate of acceleration in R160 is 500Hz）;
   — Minium shift step: reciprocal of recoridng frequency of EDR sensor.
3. Decide tolerance according to physical range of the EDR sensor.