Supplementary

The supplementary contains: Two supplementary tables about the tuning calculations and two videos. The two tables *Parameter tuning basic method.xlsx* and *Parameter tuning improved method.xlsx* show the detailed results of basic and improved method parameter tuning for all 4 flights and all 3 encounters in each flight. All of the considered parameter combinations are listed together with the system decision (safe or danger), vehicle distances after the EGV stops and driver notification times until the notification about the danger is held by the system. Different coloring was applied upon evaluation of the results described below.

The videos show vehicle tracking and decisions from the first flight evaluated in detail in the article (see Figures 36—38). The video with basic decision was recorded on 30 September 2022 during the final demonstration applying the initial parameters. The video with the improved decision was recorded running the new algorithms on the previously recorded image sequence. Thus, the images are the same; only the trajectory coloring is different due to the different decisions (see the detailed descriptions).:

- **Parameter tuning basic method.xlsx** Parameter tuning results for the basic method considering all possible combinations of the possible parameter values from Table 5 for all flights and encounters. The coloring rules during evaluation are as follows:
  - Light green: correct decision, 0 (safe) for 1st and 2nd encounter and 1 (danger) for the 3rd one with positive distances.
  - Red: incorrect decision or negative remaining distances after the EGV stops.
  - Orange: correct 1 (danger) decision for the 3rd encounter with negative firm braking and positive emergency braking distances.
  - Brown: final best candidates giving correct decisions for 3rd encounters of flight 1 and 2 and the 1st encounter of flight 1.
  - Dark green: the selected best set.
- **Parameter tuning improved method.xlsx** Parameter tuning results for the improved method considering all possible combinations of the possible parameter values from Table 7 for all flights and encounters. The coloring rules during evaluation are as follows:
  - Yellow: the range of results with $t_{shift} = 0s$ parameter.
  - Dark green: the selected best set.
- **MDPI_basic_demo.mp4** This video presents the decisions with the basic method. The blue trajectory shows the trajectory of the EGV. The other vehicle's trajectory is green when there is no danger and red when the driver is notified about the danger. In the 1st encounter, the trajectory is green all the time. In the 2nd encounter, it is first green then changes to red and after the EGV moves away it changes back to green. In the 3rd encounter, after green the other trajectory changes to red and stays red while the other vehicle moves away from the stopped EGV. Then it changes to green. This shows that the 2nd and 3rd encounters are detected to be dangerous despite the stopping other vehicle in the 2nd one.
- **MDPI_improved_demo.mp4** This video presents the decisions with the improved method. The blue trajectory shows the trajectory of the EGV. The other vehicle's trajectory is green when there is no danger, red when the driver is notified about the danger and cyan if there is a special case. In the 1st encounter, the trajectory is green, but when the EGV turns ahead of the other vehicle, it turns to cyan, showing a vehicle behind EGV special case. In the 2nd encounter, it is first green then changes to red then to green for a short time, and finally to cyan when again the other vehicle is behind the EGV. The short green section shows that there is no danger but the special case is still not confirmed (5 consecutive special case samples are required to decide a special case). In the 3rd encounter, it is first green then changes to red then green for a short time then cyan and finally green. As the EGV stops and the other vehicle drives

away in front of it, after a time it leaves the $\pm 30^\circ$ field of view of the driver and so the special case changes to a safe case. This shows that the 2nd and 3rd encounters are detected to be dangerous despite the stopping other vehicle in the 2nd one and the special cases are detected and indicated well.