



Peloton



Platooning: Real Safety, Real Savings

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How Safe is “Safe”



Goal: Safer after pushing button than before

Foundation in Safety

Goal: Not Just Safer Overall, but also:

- Safer even than trucks equipped with CMS/AEB
- Safer in key types of situations:
 - Lead truck hard braking
 - Lead truck collision



Situation: Front truck hard braking



Situation: Front truck collisions

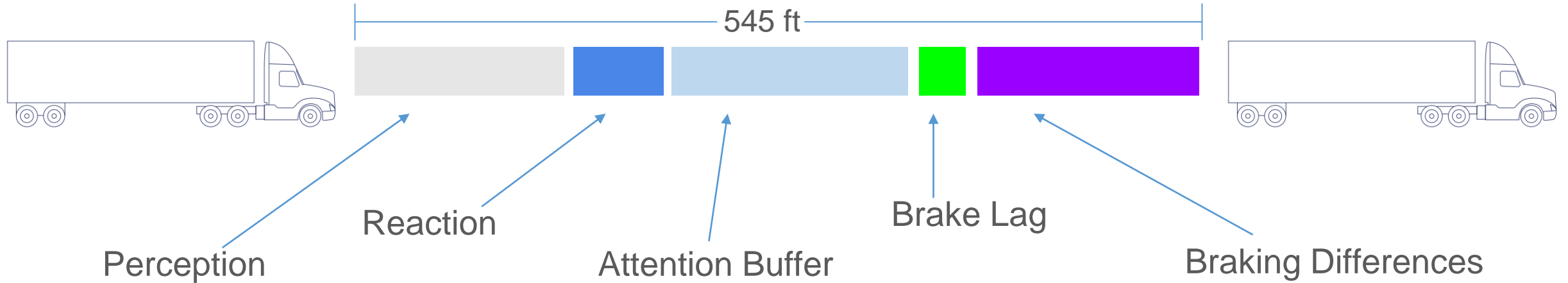


How We Make Platooning Safe



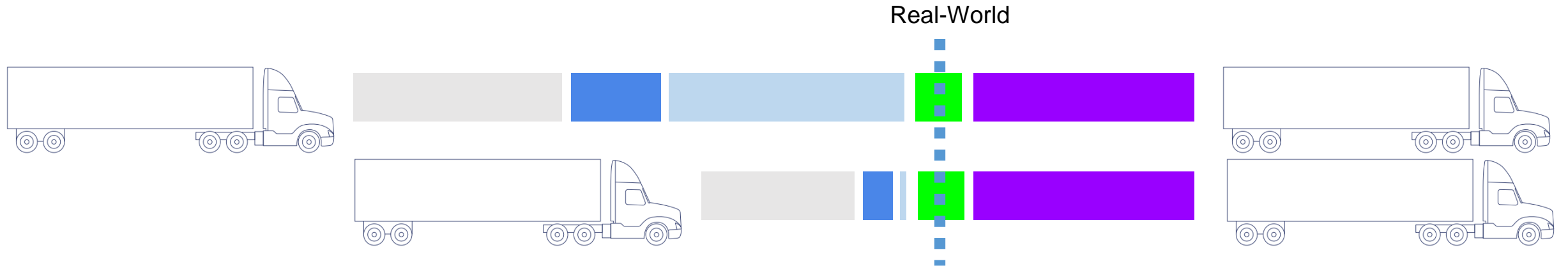
- Safe Functionality:
 - **V2V+V2Cloud**
- Safe Design/HW/SW:
 - **ISO26262**
- Safe Driver:
 - **UI, UX, Driver Study**

Manual Following



- Safe following distance is many hundreds of feet
- Real world following distances much shorter
 - Collision rate significant
- Many collisions at high impact velocity

Radar/Lidar Following

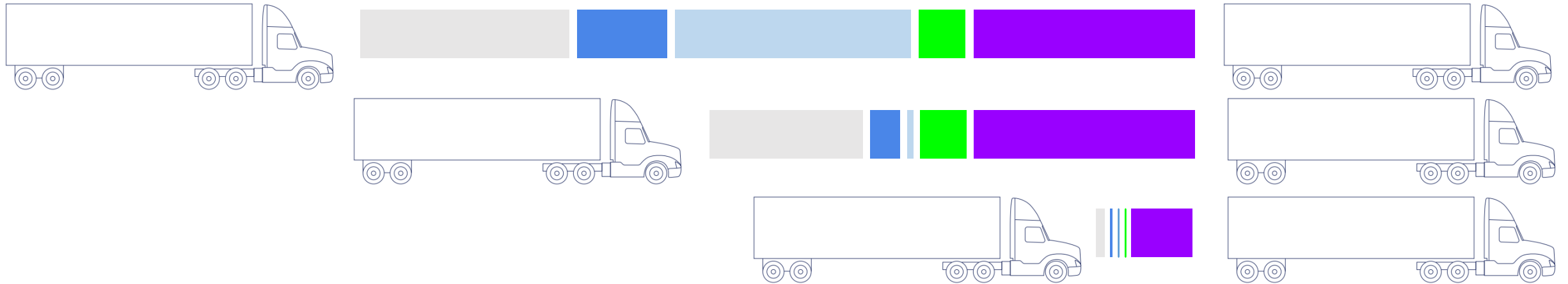


Attention Buffer Eliminated

Perception/Reaction decreased

- Reduces to ~300ft safe distance
- In real world, cut in vehicles frequently reduce following distance: Average of <200ft following distance
- Lower but still significant collision rate
- Mitigates impact velocity of many collisions

Platooning



- Brings following distance down to 30-50ft
- Reduces cut-ins → Maintain platoon most of the time
- Our data/analysis suggests:
 - Collisions can still occur, but lower rate
 - Impact velocity reduced in most cases

Power of V2V



Applying ISO 26262* to Platooning

ISO used to create traceable **design requirements** for **V&V**

- **Item Def:** specifies functional concept and Operational Design Domain (ODD)
- **HARA:** identifies hazardous scenarios based on Item Def and generates Safety Goals and ASIL ratings
- **Functional Safety Concept (FSC) and Functional Safety Requirements (FSRs):** high level strategy, FSR and ASIL allocation to system components.
- **Technical Safety Concept (TSC) and Technical Safety Requirements (TSRs):** Specification of Safety Mechanism into testable requirements



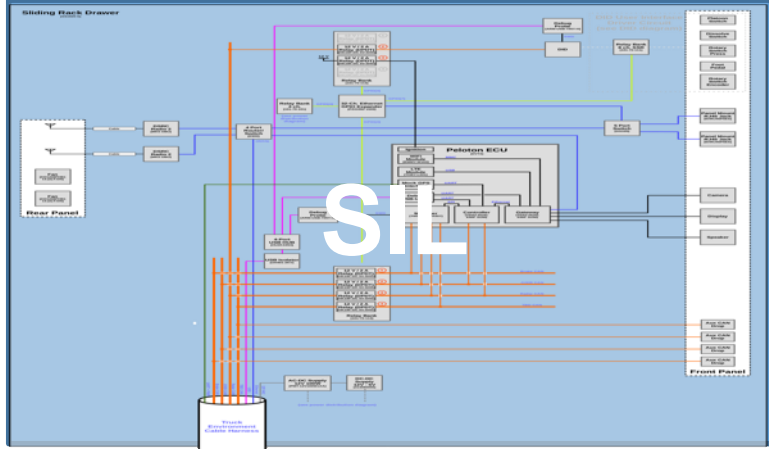
How We Test



HiL



Closed Course



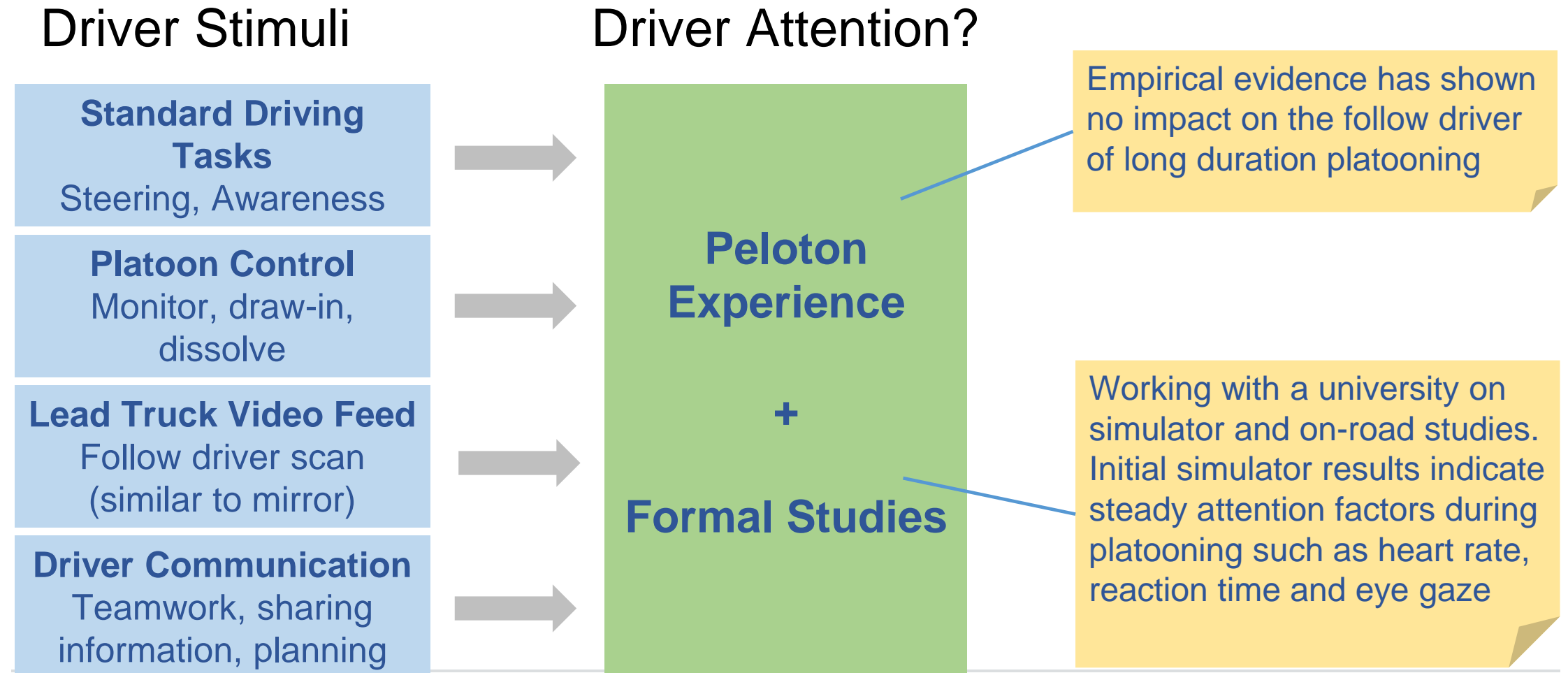
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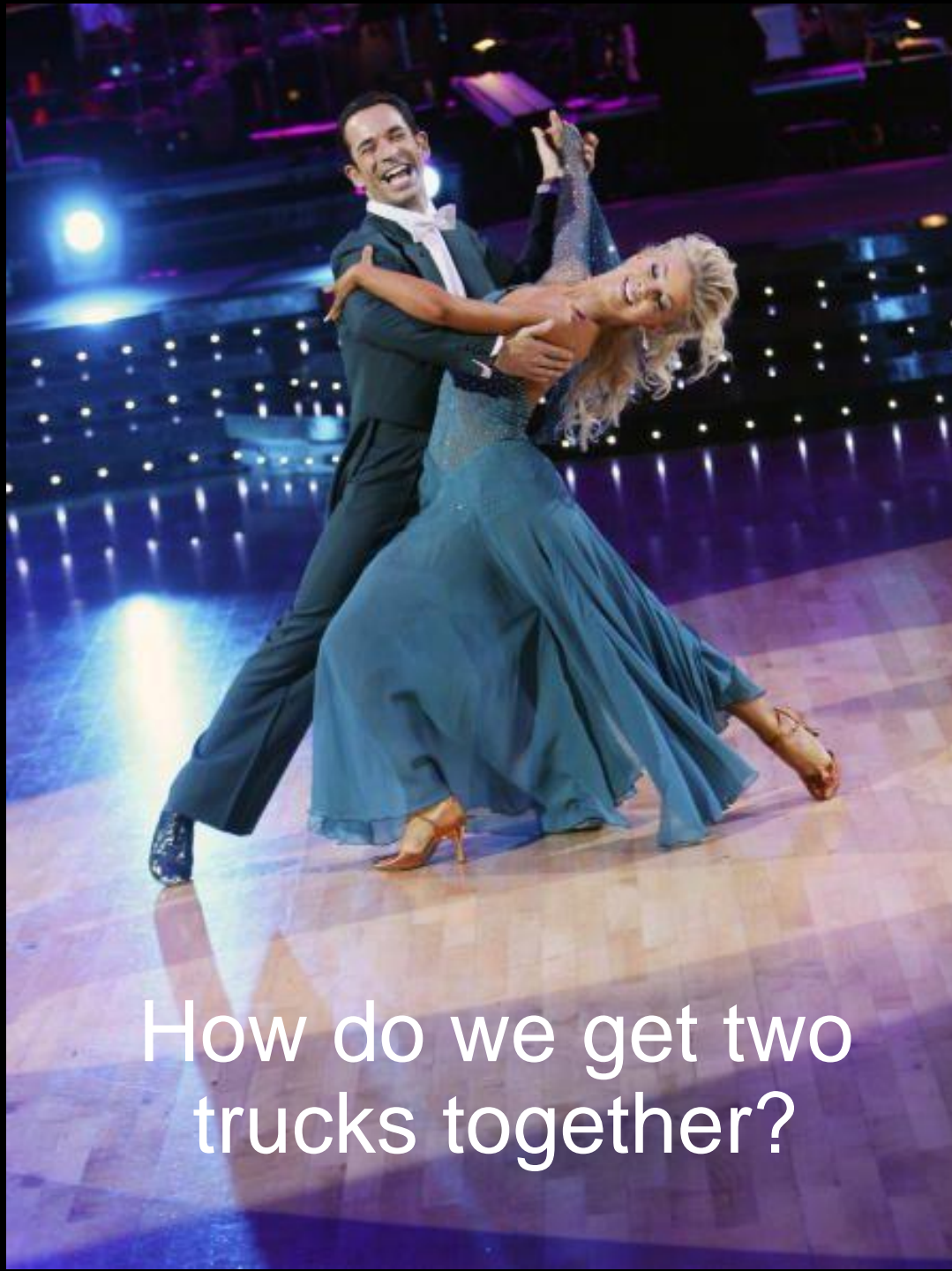
Road

All tied to
ISO26262-Derived
Requirements

Impact of platooning on drivers' attention



Real Savings



How do we get two
trucks together?

Maximize Platooning Usage

Long-Term

Ubiquitous
Platooning

- Density creates opportunities
- Cross-fleet, cross-shipper
- Opportunistic in addition to scheduled

Maximize Platooning Usage

Low Hanging Fruit

Intra-Fleet

- Pairs (or more) of trucks from within the same fleet
- Typical in LTL, dedicated, linehaul, relay style operations

Long-Term

Ubiquitous
Platooning

Maximize Platooning Usage

Low Hanging Fruit

Long-Term

Intra-Fleet

Facilitated/
Coordinated

Ubiquitous
Platooning

- Major Shippers
- Brokerages/3PLs
- Peloton NOC
- Telematics Partnerships



Peloton

140ft

23.8mi

Press **START** button

Platoon distance will be 98ft

PARKING BRAKE

TRAILER AIR SUPPLY

Object Detected

142 ft

Bendix

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