A Language of Automation

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Upshot

- Say what you mean

- Definitions should help, not hinder

- Emerging international consensus

- Key distinctions

- Companies drive automated vehicles

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Say what you mean

"driver"

"control"

"driverless"

"self-driving"

"autonomous"

"fully automated"

"highly automated"

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"Drivers shall at all times be able to control their vehicles"

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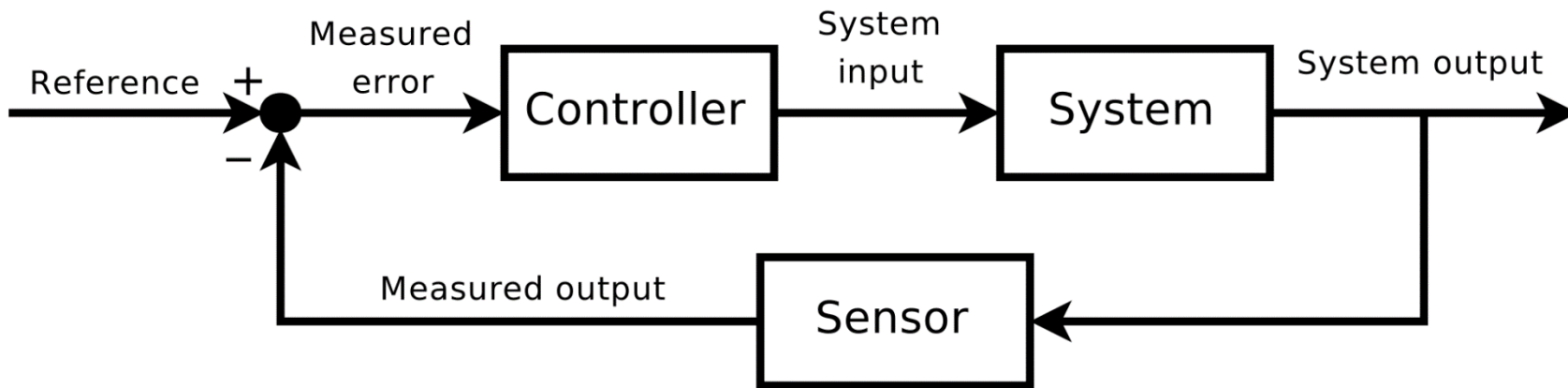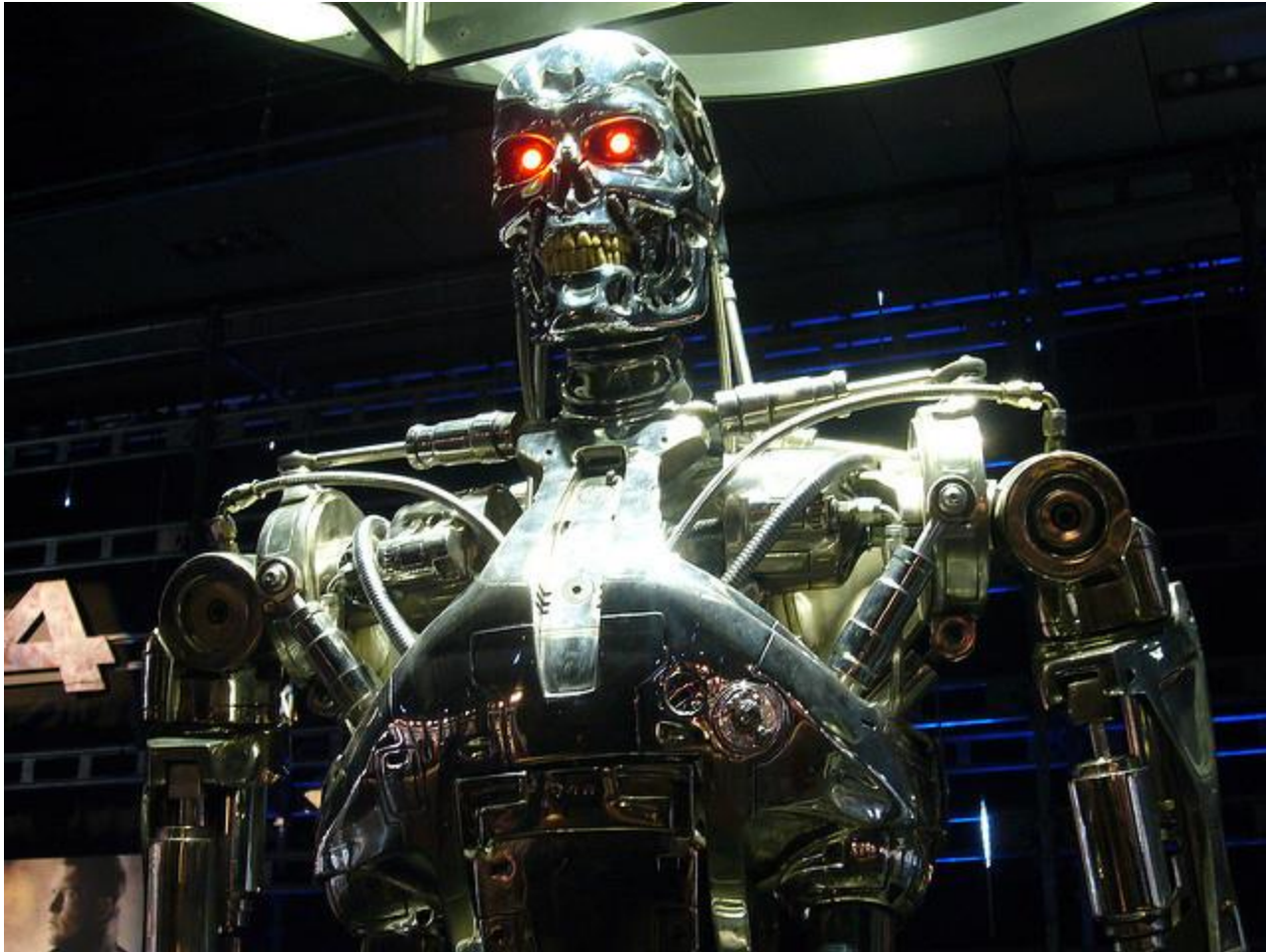
Definitions should help, not hinder

- Definitions are a means, not an end

- Do use definitions to speak clearly and efficiently

- Do not let definitions slow substantive progress

- "Don't let the perfect be the enemy of the good"

- When in doubt, just *say what you mean!*

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Emerging international consensus

- BASt definitions (2013)

- **SAE J3016** (2014, 2016, **2018**)
  - "Taxonomy and Definitions for Terms Related to On-Road Motor Vehicle Automated Driving Systems"

- Declaration of Amsterdam (EU members + EC)

- ISO/SAE 22736 joint working group

- Global Forum for Road Traffic Safety Resolution on Highly and Fully Automated Vehicles

- National practice….

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Key distinctions

- Trips

- Vehicles

- Features

Driving

- Driving involves paying attention to the vehicle, the road, and the environment so that you can steer, brake, and accelerate as needed.

- If you're expected to pay attention, you're still driving—even when a vehicle feature is assisting you with steering, braking, and/or accelerating.

- Driving may have an even broader legal meaning (*including in UNECE conventions*).

Types of trips

- You must drive for the entire trip

- You will need to drive if prompted in order to maintain safety

- You will need to drive if prompted in order to reach your destination

- You will not need to drive for any reason, but you can drive if you want

- You will not need to drive for any reason, and you can't drive

Types of vehicles

- Vehicles you can drive

- Vehicles you can't drive

Types of vehicle features

- The **levels of driving automation** describe features in vehicles rather than the vehicles themselves. This is because a vehicle's feature or features may not always be engaged or even available.

- The **operational design domain** (ODD) describes when and where a feature is specifically designed to function. For example, one feature may be designed for freeway traffic jams, while another may be designed for a particular neighborhood in good weather.

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Assisted driving features

- **L0**: You're driving

- **L1**: You're driving, but you're assisted with either steering or speed

- **L2**: You're driving, but you're assisted with both steering and speed

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Automated driving features

- **L3**: You're not driving, but you will need to drive if prompted in order to maintain safety

- **L4**: You're not driving, but *either*

  - a) you will need to drive if prompted in order to reach your destination (in a vehicle you can drive) *or*

  - b) you will not be able to reach every destination (in a vehicle you can't drive)

- **L5**: You're not driving, and you can reach any destination

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But this gets complicated fast

On reaching a crash site, an ADS-equipped vehicle stops in its lane until someone at a monitoring center sketches a travel path. Using its sensors, it then follows this path.

1) What level is this feature?

2) Is there a remote driver?

Promise to the public

By describing a feature's level of automation and operational design domain, the feature's developer makes a *promise to the public* about that feature's capabilities

Companies drive automated vehicles

- Is an **individual user** driving the vehicle?

  OR

- Is a **company** driving the vehicle?