

# Regulating Automated Driving

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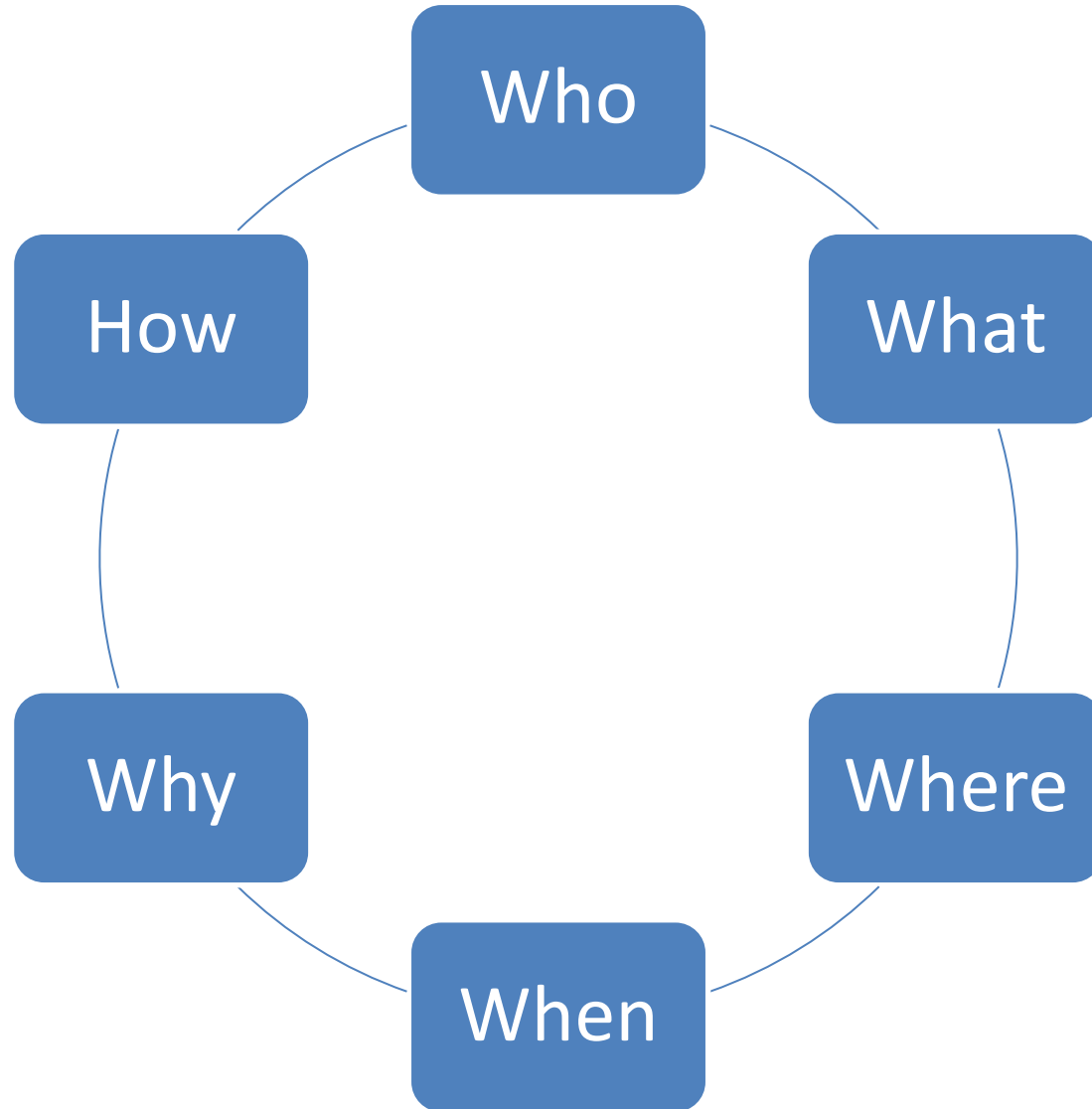
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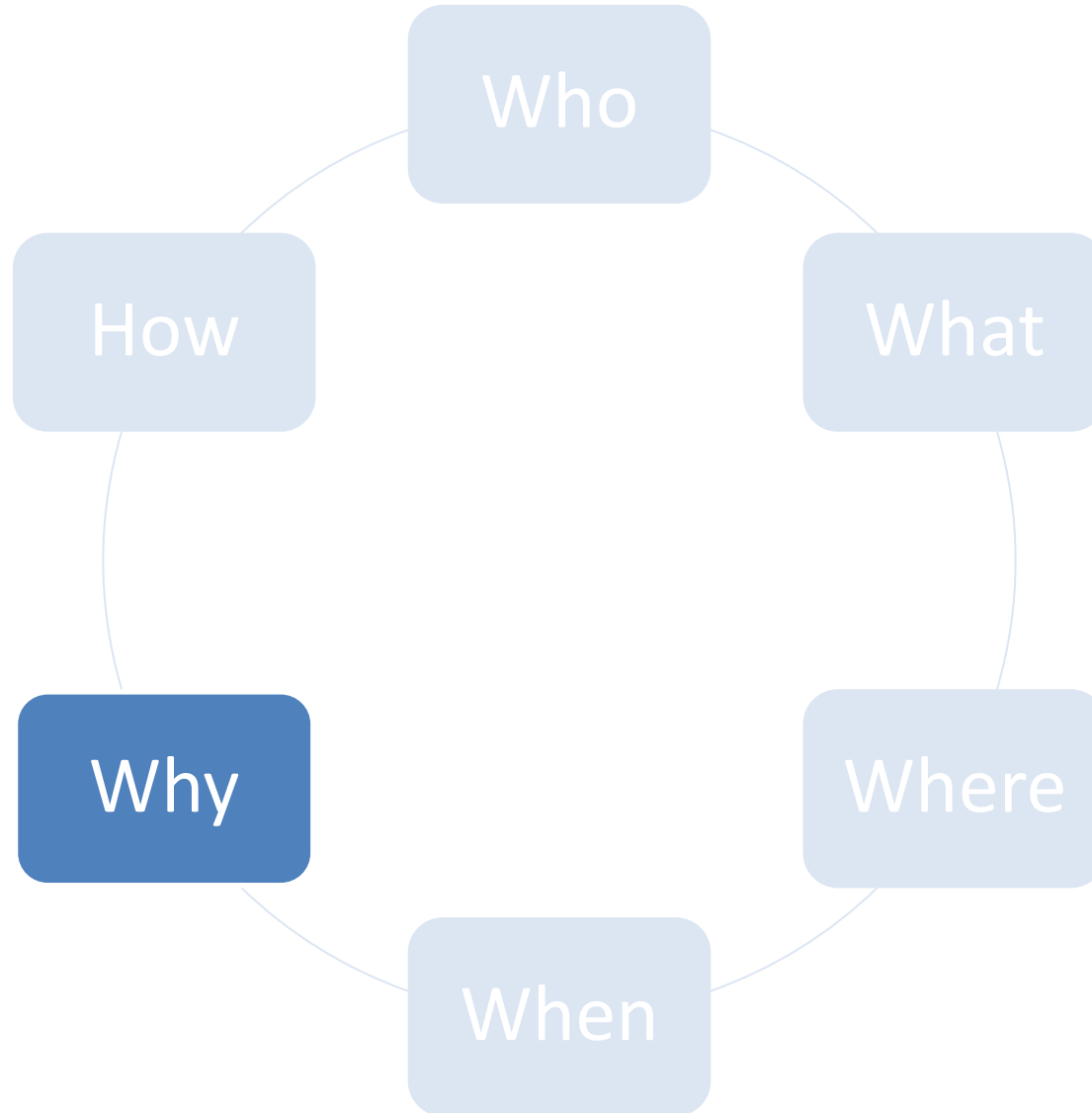
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# Regulation



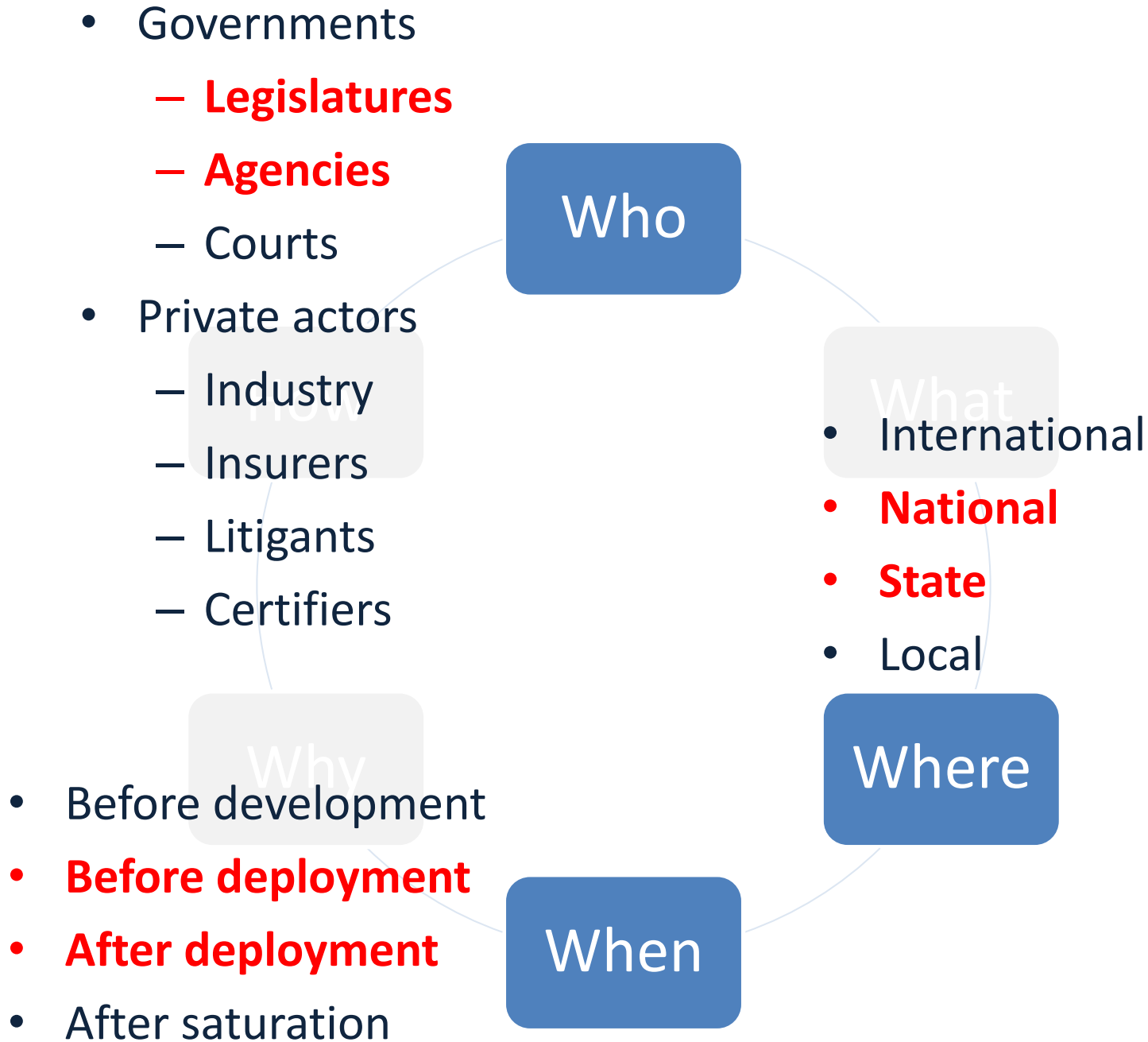
# Regulation



To check market failures that threaten

- Individual autonomy
- Individual safety
- Societal efficiency





- **Actor**

- Producer
- Modifier
- User
- Operator
- Insurer
- Certifier

How

- **Product**

- Vehicle
- Systems

Why

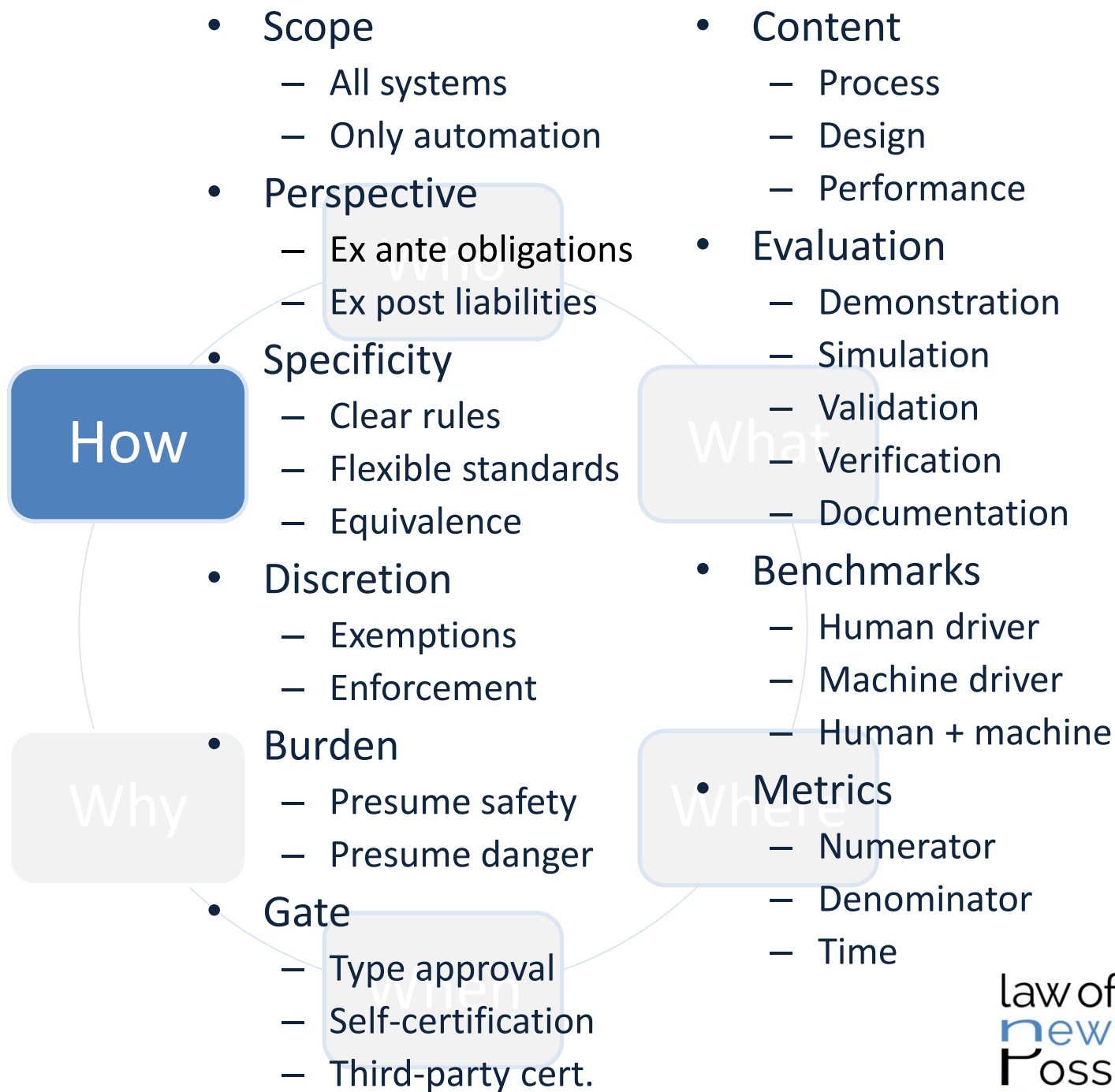
- **Environment**

- **Activity (Gateways)**

- Design
- Testing
- Deployment
- Production
- Sale
- Modification
- Registration
- Insurance
- Use
- Operation
- Monitoring
- Maintenance
- Recall
- Disposal

What

Where





# Upshot

**Key: Have the relevant technologies reached a demonstrated level of socially acceptable risk?**

- How safe is safe enough?
- How is this safety demonstrated?
- Who decides?

# Changing context

- Driver is part of the system
- Vehicle is the driver
  
- Remote monitoring
- Over-the-air updates
  
- Pilots and betas
- Third-party modifications
  
- Service models for navigation
- Service models for mobility
  
- 100 million miles between fatal crashes today
- Design mean time between failures  $> 10^6 = 1$  billion hours

# Our task

1. Will our old methods and structures of automotive regulation work for automated driving—or do we need new ways?
2. What are our potential options for methods and structures of regulation?

# My proposal: Public safety cases

- Developers make a public argument for the safety of their systems
- Regulators, with input from the public, evaluate the reasonableness of that argument
- Regulators exercise substantial discretion and receive substantial deference

# Public safety case example

1. **Scope:** Company X wants DMV to permit registration of its new vehicles
2. **Documentation:** Company X documents its design process (ISO 26262), the results of its testing and simulation, and its plans for monitoring and updating
3. **Presentation:** Company X releases this information publicly and argues why it demonstrates a reasonable approach to safety
4. **Public comment:** Academics, consumer watchdogs, and Company X's competitors identify general and specific concerns
5. **Public response:** Company X substantiates or modifies its safety case in response to these concerns
6. **Agency determination:** The DMV determines whether Company X's safety case, including its response, is reasonable
7. **Agency action:** The agency agrees to register vehicles that the developer certifies to comply with its safety case

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