Automated Driving Law and Policy

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and (by courtesy) School of Engineering

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Jaco A. Riis, A Ten Years' War: An Account of the Battle with the Slum in New York (1900), gutenberg.org

https://commons.wikimedia.org/wiki/File:SmogNY.jpg

$$\sum(\text{old problems}) \; < \; \sum(\text{new problems})$$

?

Self-Driving Tesla Was Involved in Fatal Crash, U.S. Says

By **BILL VLASIC** and NEAL E. BOUDETTE JUNE 30, 2016

Lessons From the Tesla Crash

By **THE EDITORIAL BOARD** JULY 11, 2016

Inside the Self-Driving Tesla Fatal Accident

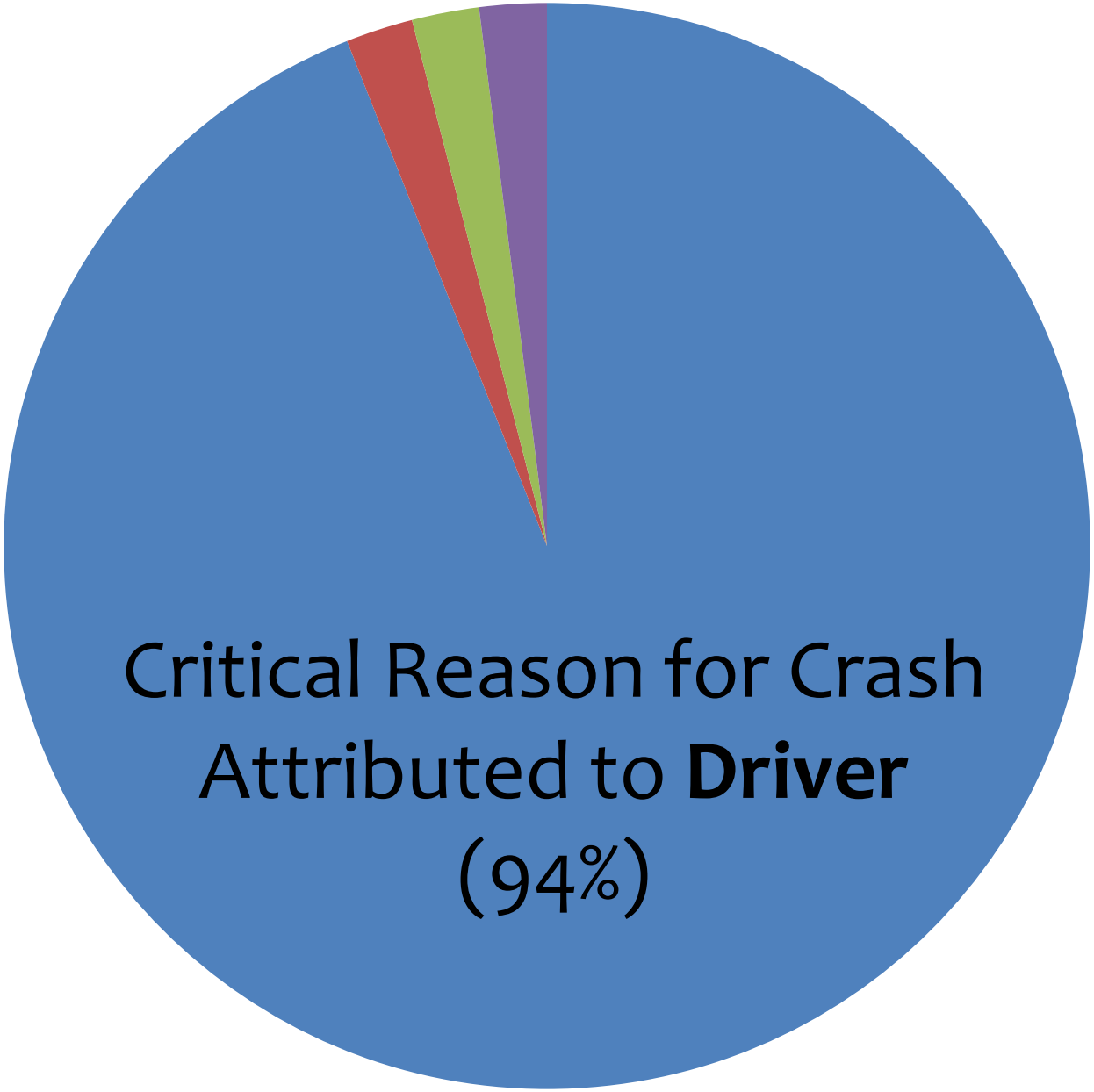
By ANJALI SINGHVI and KARL RUSSELL UPDATED July 12, 2016

As U.S. Investigates Fatal Tesla Crash, Company Defends Autopilot System

By **BILL VLASIC** and NEAL E. BOUDETTE JULY 12, 2016

A Lesson of Tesla Crashes? Computer Vision Can't Do It All Yet

By **STEVE LOHR** SEPT. 19, 2016


Critical Reason for Crash
Attributed to **Driver**
(94%)

Who is responsible for a driverless car accident?

8 October 2015 | Technology

Share

Liability for accidents involving driverless cars is becoming a big issue worldwide

30 million uninsured drivers

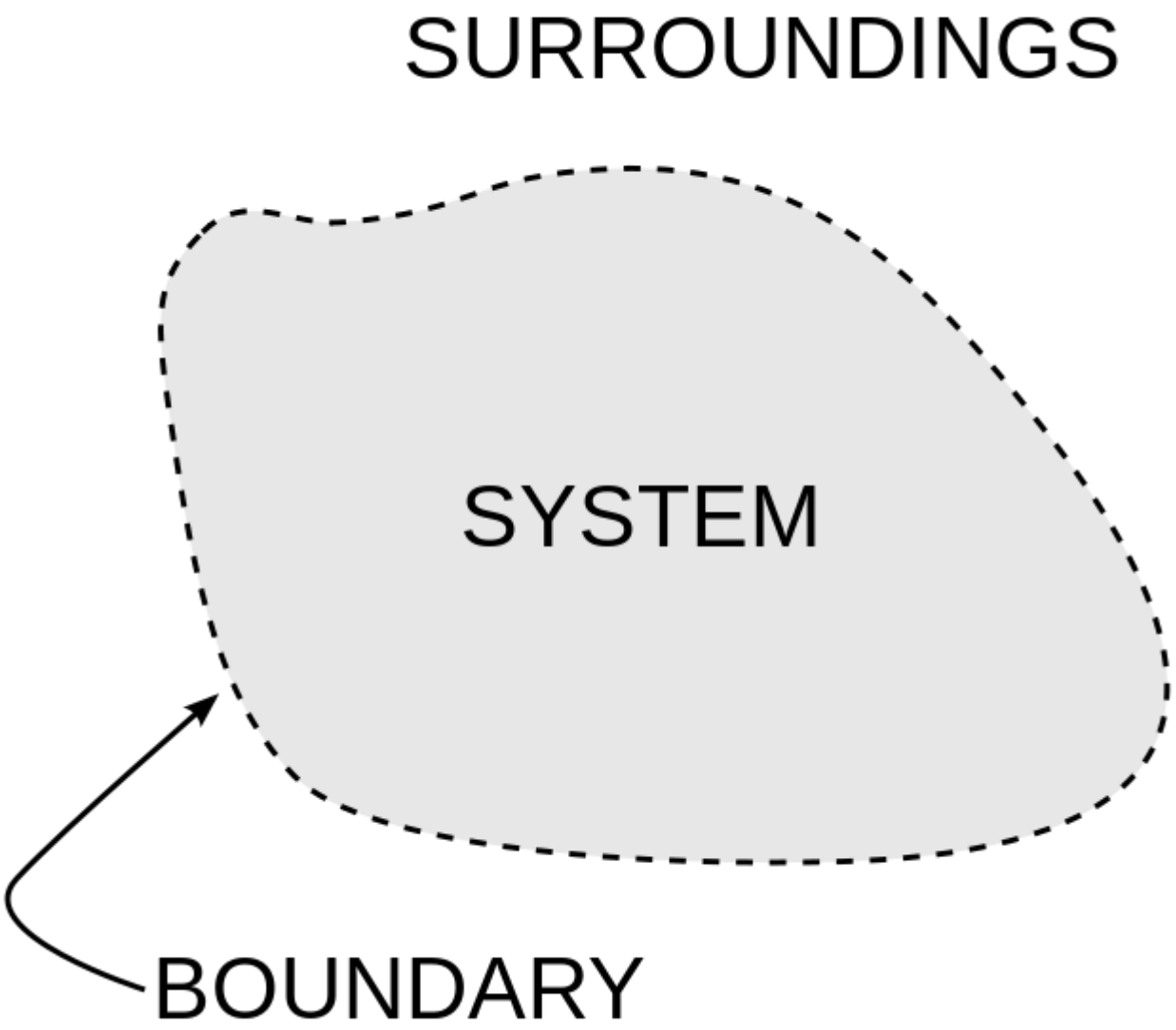
$30,000 per injury

up to $60,000

$$\frac{\$30{,}000}{\$10{,}000{,}000} = 0.3\%$$

https://www.amsa.gov.au/environment/protecting-our-environment/major-historical-incidents/Kirki/index.asp

(The Front Fell Off)



https://en.wikipedia.org/wiki/File:System_boundary.svg

Elimination of jobs in transportation and logistics. Disruption of medium-haul airline travel. Changing traffic patterns. Increase in sprawl. Redesign of urban areas. Reuse of parking lots. Reduced revenue streams for local governments. Expansion of educational mobility. Increase in child independence. Privatization of public spaces. Reduction in police interactions. Increased safety and mobility for bicyclists and pedestrians. Embrace of living streets. Rejection of living streets. Increasingly sedentary behavior. Corporate omniscience. Perfect enforcement of existing law. Overenforcement of existing law. Increase in systematic vulnerabilities. Disruption to crash economy. Reduction in organ donations. And so on.

Prepare

Inform

Clarify

Restrict

Promote

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Prepare

Develop a spectrum of scenarios with assumptions about impact and probability

Inform

Create a robust break-the-glass plan that anticipates and responds to a serious automated driving incident

Clarify

Specify that the user of a commercial automated driving service is not the driver or operator

Restrict

Mandate that any developer or deployer of an automated driving system file its 15-point safety assessment with NHTSA

Promote

Internalize the costs of driving through taxes, fees, insurance, and enforcement

How Governments Can Promote Automated Driving

Bryant Walker Smith, University of South Carolina School of Law | newlypossible.org | law.sc.edu/faculty/smith | cyberlaw.stanford.edu/bws

Public officials frequently ask what their governments can do to promote and attract automated vehicles. This poster previews potential state and local strategies, some of which may also have national relevance. As the color coding below indicates, the different technologies and applications that constitute automated driving may demand different strategies:

Paths to fully automated driving		Color key for each individual strategy	
"Something Everywhere"	1) Increasing capability of advanced emergency intervention systems (AEIS) 2) Increasing capability of advanced driver assistance systems (ADAS)	Primarily promotes AEIS/ADAS	Primarily promotes all three pathways
"Everything Somewhere"	3) Increasing capability of driverless systems	Primarily promotes driverless systems	

For further discussion of each of the strategies below, please see Bryant Walker Smith, How Governments Can Promote Automated Driving, forthcoming at newlypossible.org.

Prepare government

- Identify a single point of contact
- Learn from credible sources
- Account for automation in planning processes
- Allocate resources commensurate with expectations

At the state level, this person should have the authority and credibility to coordinate among the state's various administrative agencies, between the governor and the legislature, between federal and state authorities, and between state and local authorities. Moreover, this person should act as a liaison between the public and private sectors. Companies and universities in the state may already be engaged in potentially relevant work, and if a large or small developer of automated systems is considering a jurisdiction for development, demonstration, or deployment, it should know precisely whom in government to call.

Prepare physical and digital infrastructures

- Maintain roadways
- Review design, operation, and maintenance policies
- Ensure these policies are followed
- Strengthen and standardize data management
- Update vehicle registration databases
- Coordinate with USDOT on DSRC

Roads—even major ones—in much of the United States are in poor condition. Highway lane markings used by some lanekeeping systems are frequently faded or, worse, simply wrong. Potholes and other pavement deficiencies that are unlikely to be detected or avoided by current lane centering systems can be found even on major freeways. Debris and other foreign objects that could conceivably confuse an automated emergency intervention system litter roads and shoulders. Addressing these conditions could help to improve the effectiveness of near-term automated systems.

Prepare society

- Educate the public on the dangers of driving today
- Develop a break-the-glass plan for automation incidents
- Recognize broader technological and social changes
- Develop strategies for structural un- and underemployment
- Say what you are doing!

Who will respond publicly to a crash, and how? What relationships will be essential to effective coordination? What evidence and information will need to be preserved, and how? Especially if officials have publicly embraced the potential of these technologies, how will they address any fear or outrage that results from a high-profile crash, regardless of where it occurs? A government that addresses these issues proactively and ultimately positively signals its credibility as a potential technological partner.

Data concerning roadways, traffic, incidents, and construction should be current, correct, and accessible. Both the public and the private sector play important roles in the collection, validation, and distribution of these data, which may be used by some advanced driver assistance systems to proactively identify locations needing updated maps and situations needing driver intervention.

Prepare legal infrastructure

- Do not just pass a new law
- Audit existing law
- Inventory existing legal tools
- Ask developers what they need
- Seek uniformity of underlying law
- Embrace regulatory reciprocity
- Incorporate technical work into law
- Employ generic legal language selectively
- Clarify the legal status of novel vehicles and services
- Tailor bans on the use of electronic devices
- Enforce laws on speeding, texting, and drunk driving
- Strengthen laws on seatbelt use
- Embrace regulatory flexibility
- Clarify enforcement discretion

A legal audit should identify and analyze every statute and regulation that could apply either adversely or ambiguously to automated driving. Automated Vehicles Are Probably Legal in the United States identifies many such provisions, from general requirements of prudent conduct to the specific New York rule that a driver must keep at least one hand on the wheel. Because vehicle codes, insurance rules, and other relevant laws vary by jurisdiction, merely enacting a uniform "automated driving law" without reference to these nuances could confuse as much as clarify.

If advancements in vehicle technologies ultimately compel novel registration or licensing determinations, treating the decisions of one jurisdiction as conclusive in another could reduce the administrative difficulties that developers might otherwise face. Reciprocity—or even unilateral recognition—could also benefit smaller jurisdictions that lack the consumer demand to motivate companies to enter the market or the public resources to establish a holistic regulatory regime.

Advanced driver assistance and emergency intervention systems might encounter situations, like a bicyclist who swerves to avoid an opened car door, that require rapid deceleration or other abrupt maneuvers that may imperil vehicle occupants who are not belted. Enforcing seatbelt laws could maximize the safety of the people both inside and outside these vehicles. Governments could also update seatbelt laws that were originally enacted when seatbelt usage was much less common. In many states, for example, statutory or common law rules restrict whether or for what purpose a defendant automaker can introduce evidence than an injured plaintiff was not wearing her seatbelt. Allowing developers of automated systems to assume that people who care about their safety will buckle up may help to ease some of the design challenges that these developers face.

Internalize the costs of driving

- Raise fuel taxes
- Raise mandatory insurance minimums
- Raise or impose parking prices

Many agencies already have relevant authority. For example, DMVs are generally authorized to deny or revoke the registration of unsafe vehicles. But these agencies do need resources and flexibility. Critically, agencies should have the authority to achieve equivalent ends through different means and to grant exceptions to statutory regimes. At the same time, governments should ensure that local enforcement discretion is exercised consistent with these policy decisions.

Policies that make vehicle owners and operators bear the true cost of driving will indirectly benefit technologies that produce gains in fuel efficiency or safety. Similarly, eliminating free and underpriced parking could encourage automation-enabled ridesharing by discouraging individual vehicle ownership.

Rationalize insurance

- Facilitate access to data
- Provide flexibility to insurers and customers
- Embrace pay-as-you-drive models

Giving insurers the data, the flexibility, and potentially even the mandate to accurately and precisely price driving risks could help smooth the introduction of automated vehicles.

Identify local needs and opportunities

- Inventory local activity centers (e.g., campuses, CBDs, ports)
- Promote unique community attributes
- Develop project proposals (public/private; local/other)

Developing a project proposal grounded in the particular conditions of the particular community can help to attract and focus local attention. At some point, the proposal could become the basis for an FTA grant application or a pitch to a private developer of automated systems.

Deploy public resources strategically

- Preference safety systems in fleet procurement, service contracts, and concessions
- Reduce subsidies for private vehicle ownership
- Seek the creative use of HOV/HOT lanes, sidewalks, living streets, traffic signals, etc.

States, counties, and municipalities in the United States own nearly 1.5 million cars, 500,000 buses, and another 1.5 million trucks. If the turnover rate for these fleets is ten percent, then these governments purchase some 350,000 vehicles annually—five times more each year than Tesla has sold in its entire existence. Because of contracts and concessions, the number of vehicles closely associated with government services is likely even greater.

Identify allies and constituencies

- Map an entire chain of support from governor to police chief
- Reach out to local advocacy groups
- Reach out to large companies based locally (e.g., insurers, hospitals)

For more information, please see the materials at newlypossible.org:

How Governments Can Promote Automated Driving (forthcoming article); Regulation and the Risk of Inaction; Automated and Autonomous Driving: Regulation under Uncertainty (2015 OECD report with Joakim Svensson); Automated Vehicles Are Probably Legal in the United States (2012 article); A Legal Perspective on Three Misconceptions in Vehicle Automation (2015 book chapter); Lawyers and Engineers Should Speak the Same Language (2015 book chapter); Proximity-Driven Liability (2014 article)

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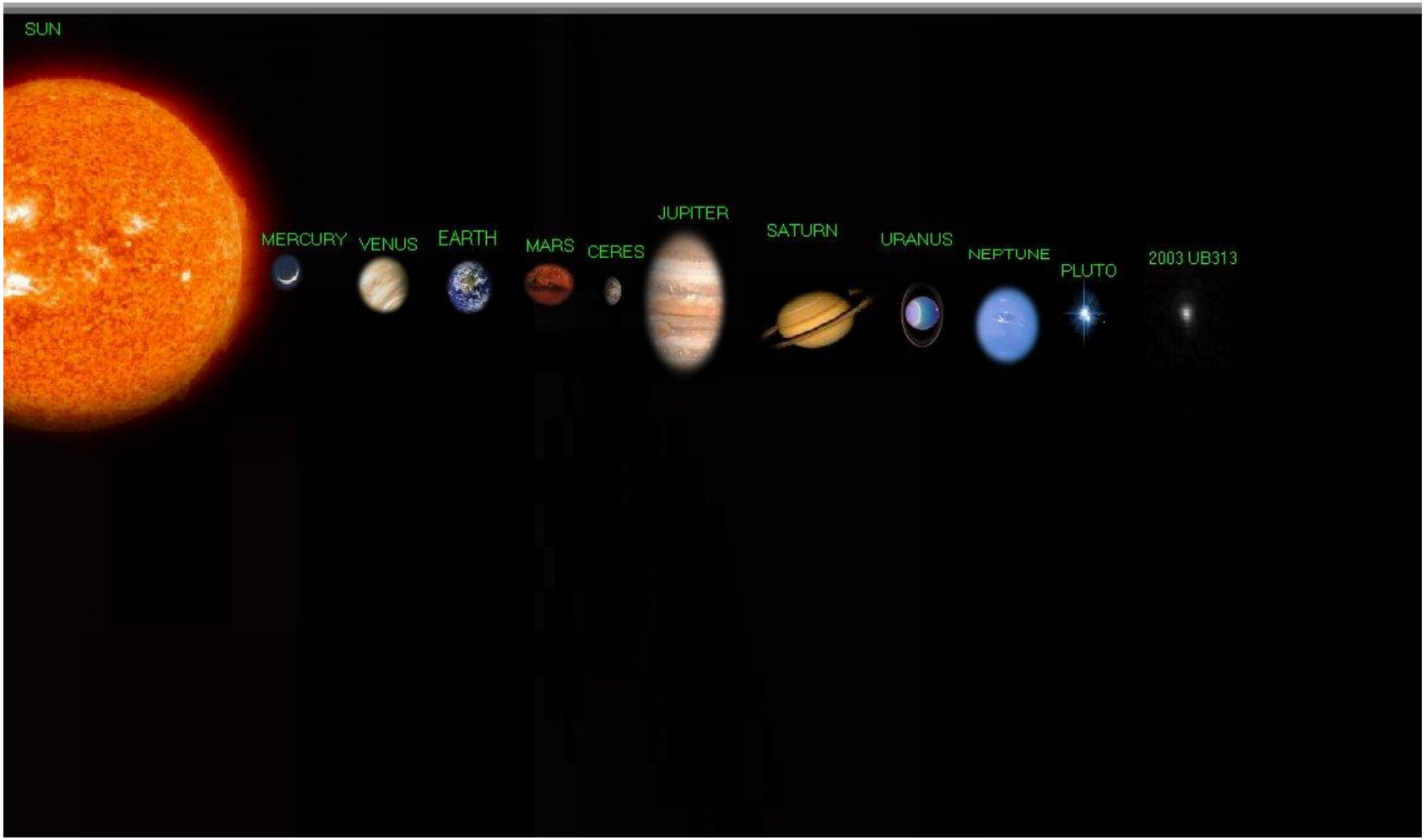

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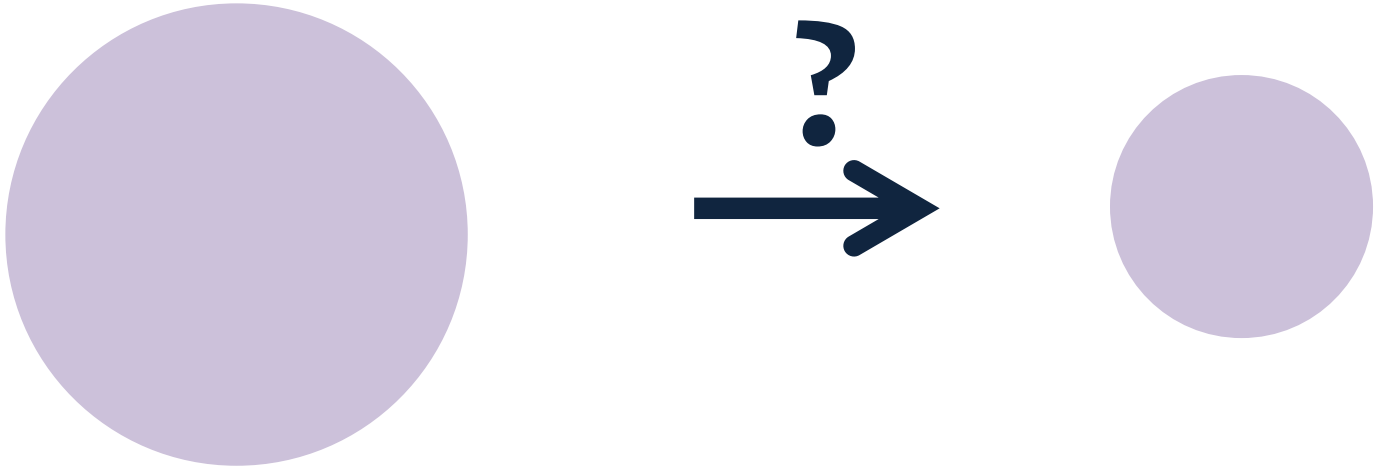
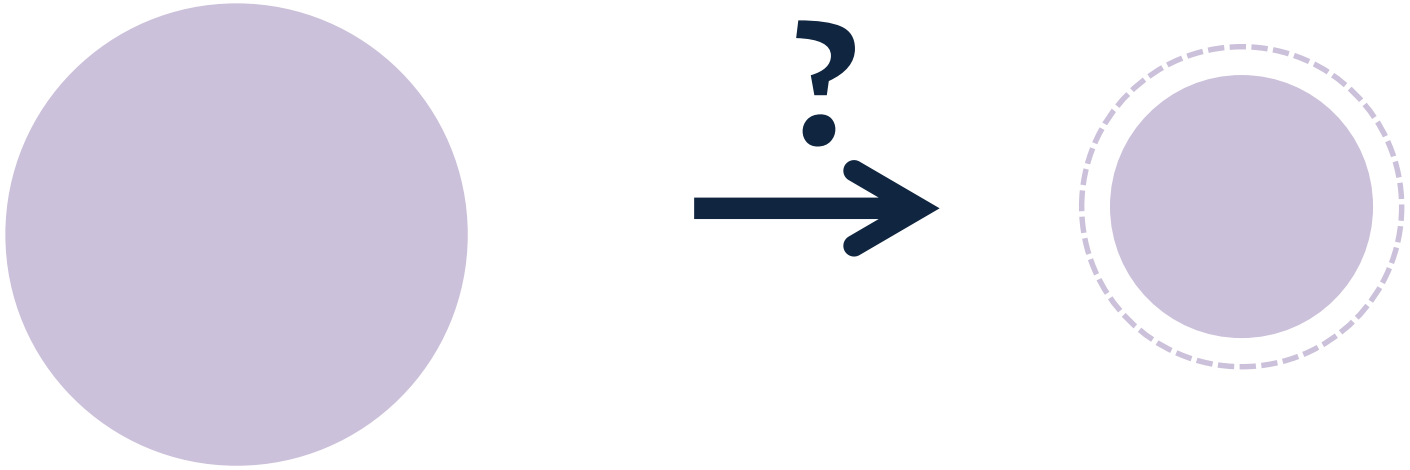
Crashes
without automation

Crashes
with automation?



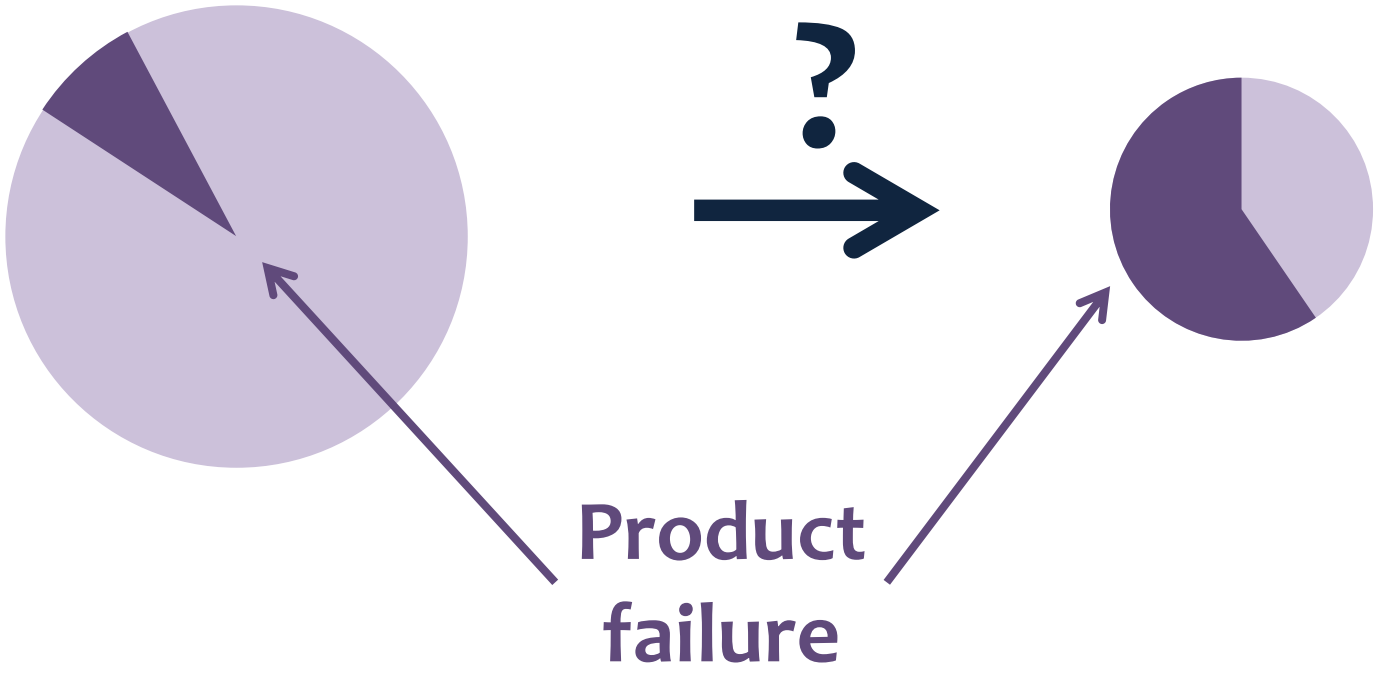
Crashes without automation

Crashes with automation?



Crashes
without automation

Crashes
with automation?



Crashes with automation: Some types of product failure

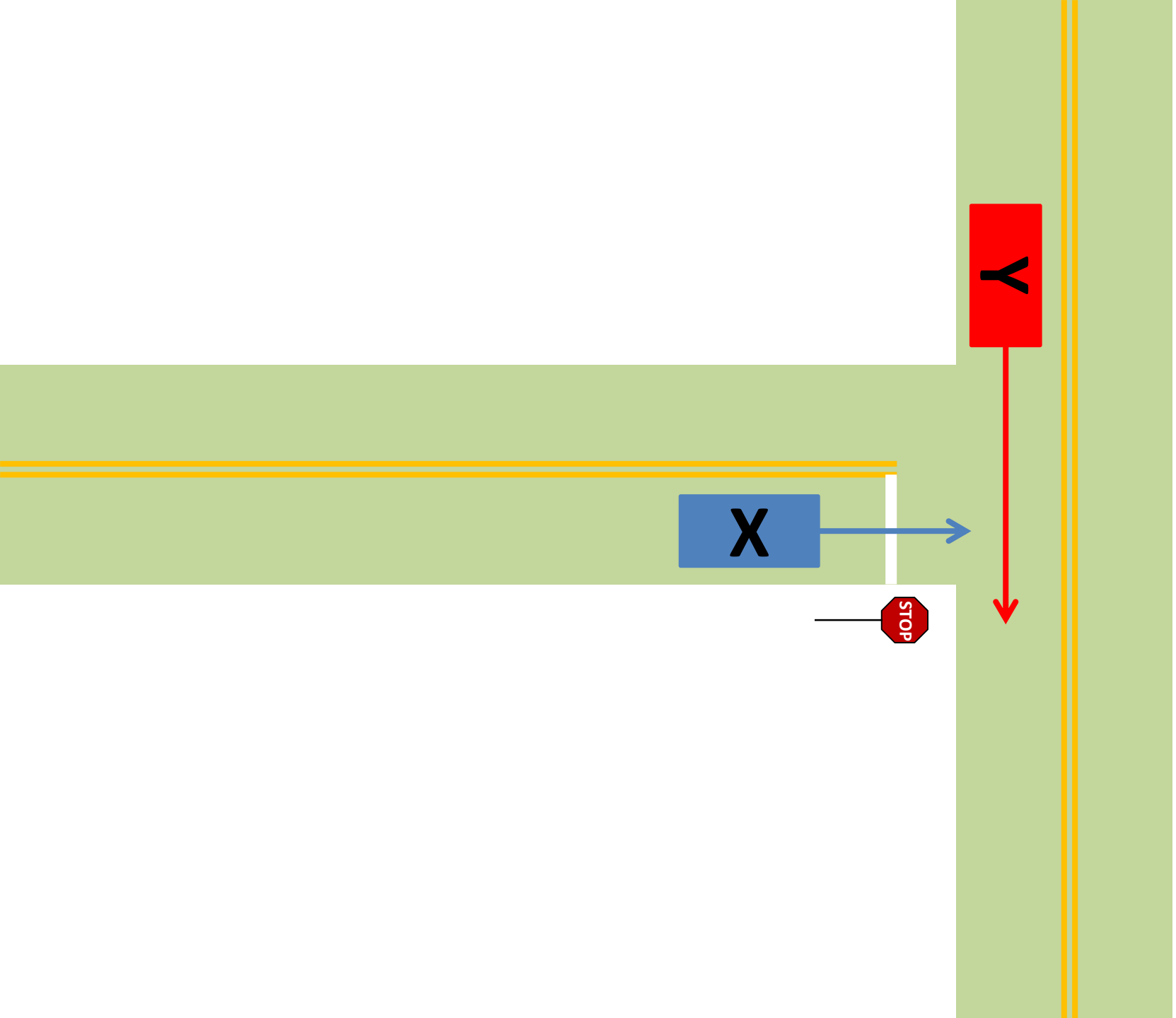
The automated driving system ...

... performed worse than a human
... performed worse than a better system

... interacted poorly with the user
... interacted poorly with other systems

... used bad data
... supplied bad data

... facilitated a security breach
... degraded ungracefully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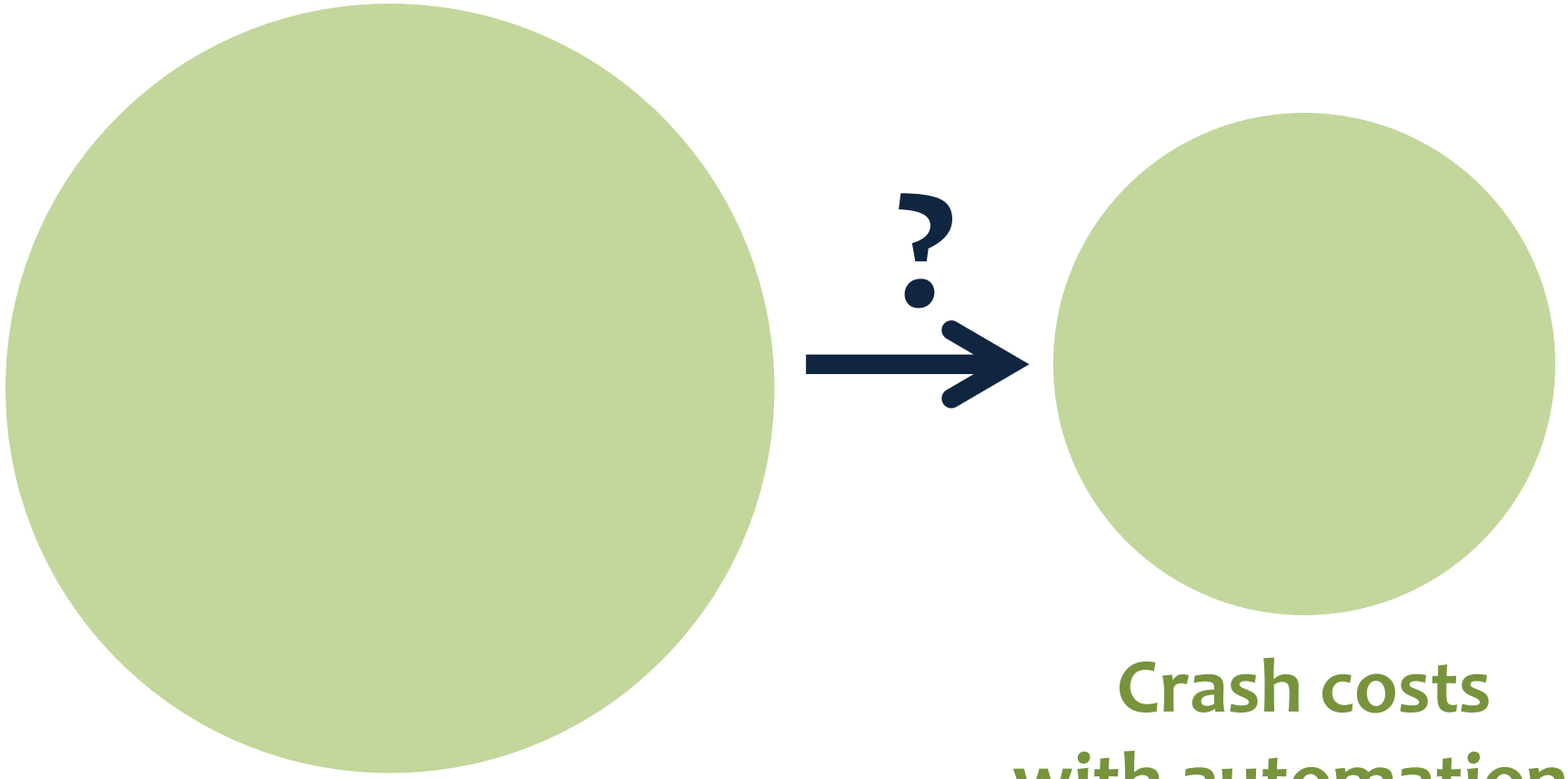
X
STOP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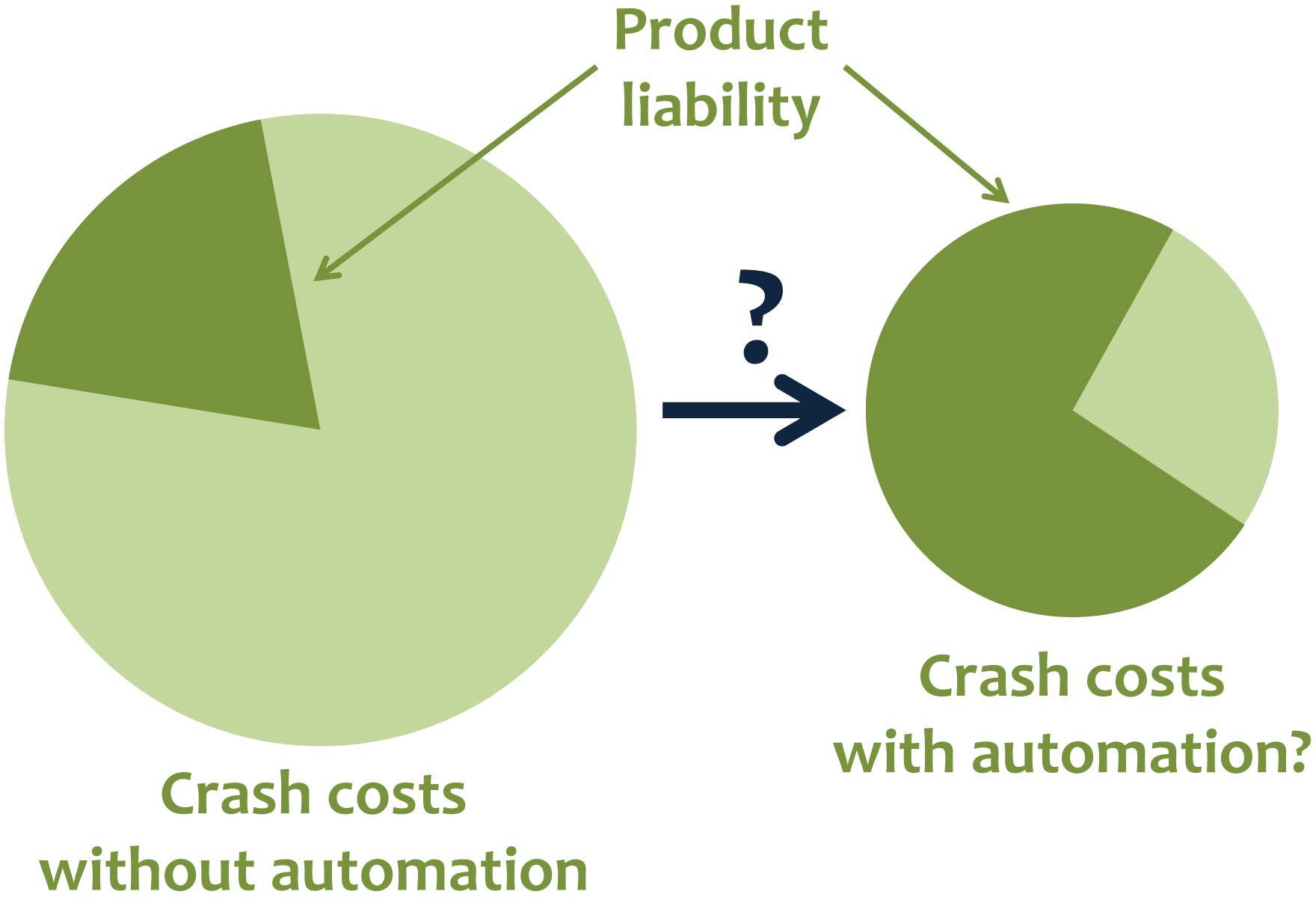
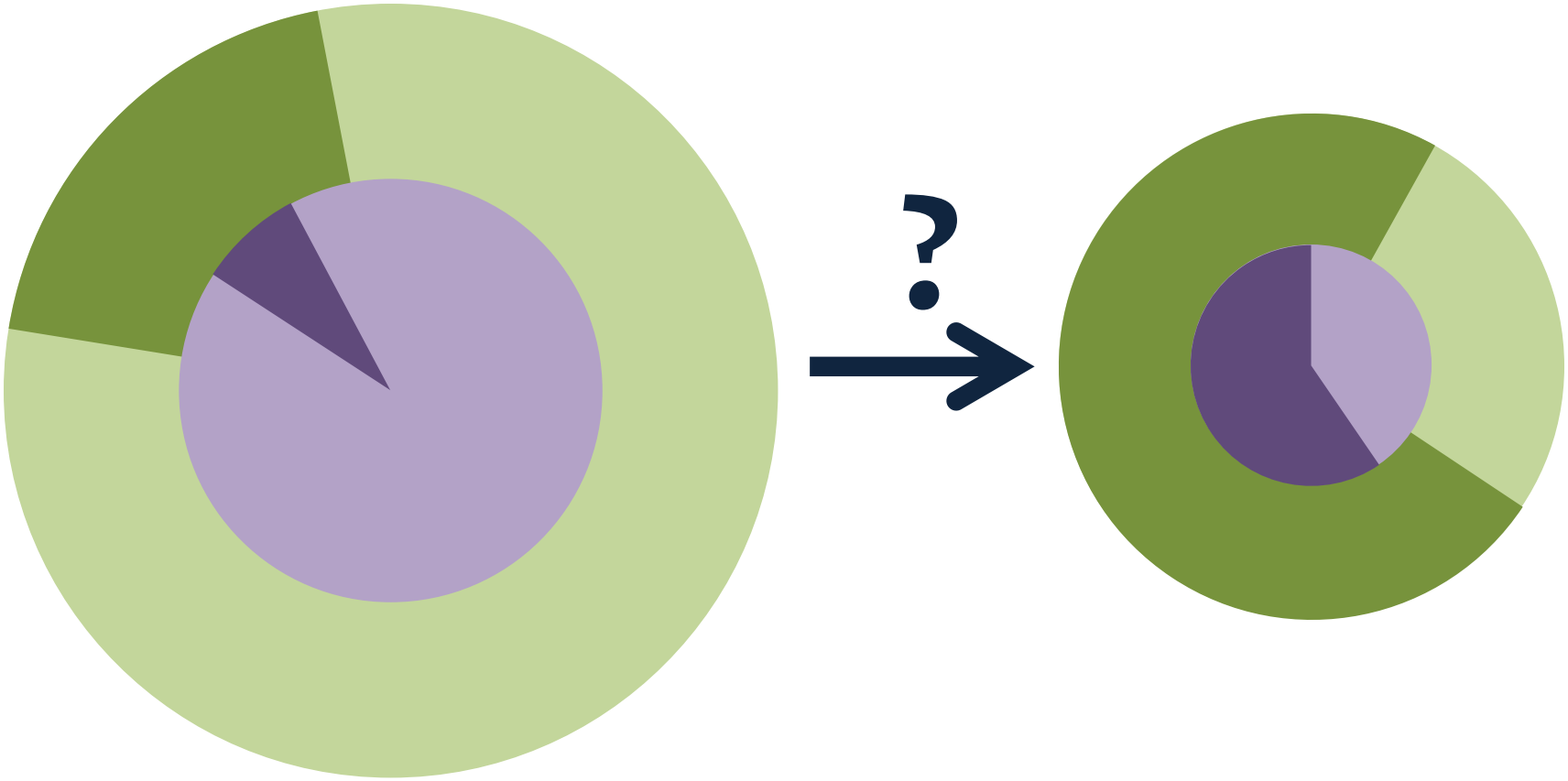
Crash costs
with automation?
Crash costs
without automation


Product liability
?
Crash costs without automation
Crash costs with automation?

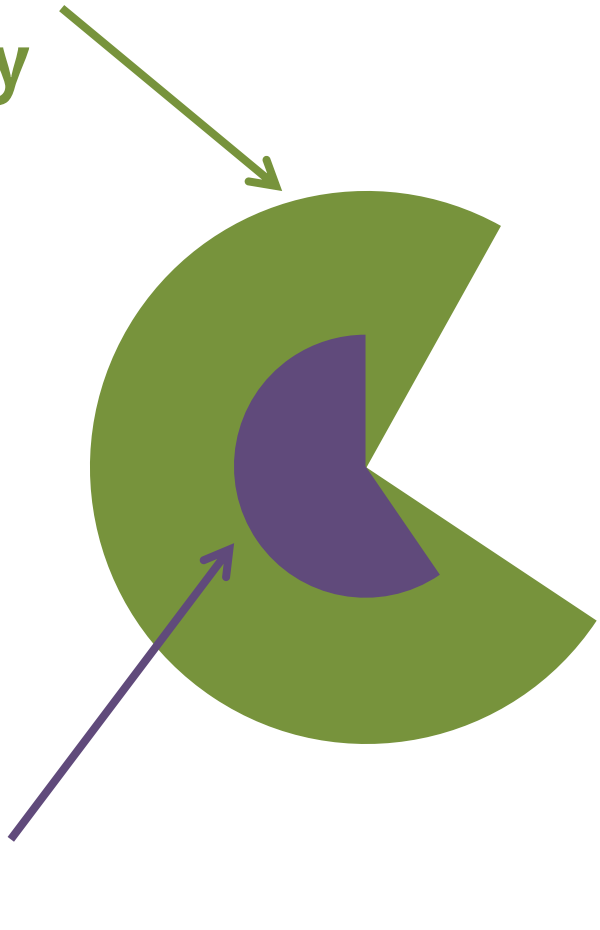
Without automation

With automation?

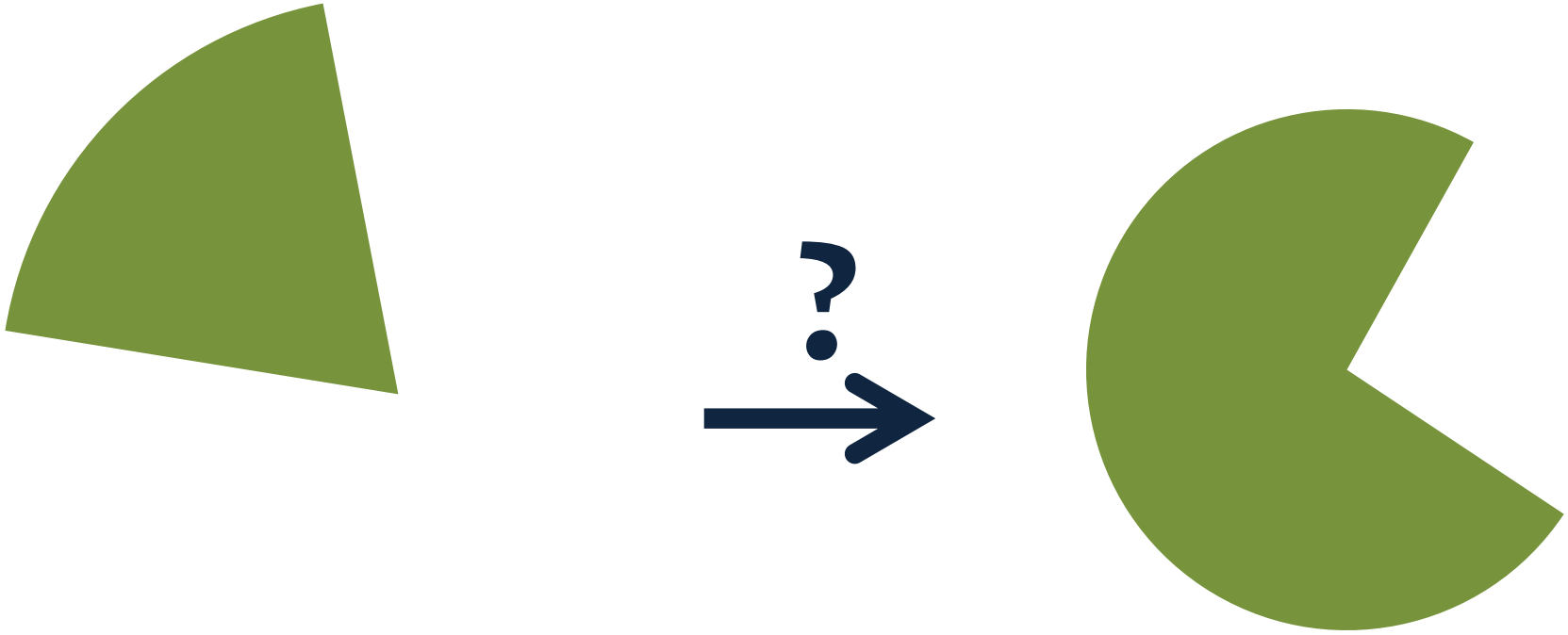


Compared to individual drivers, manufacturers …

… may face higher jury awards
… may be more likely to be solvent
… may pay more through J&S liability



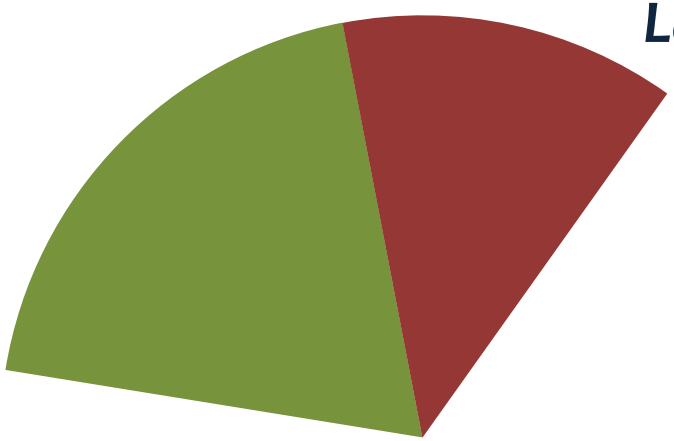
Product liability tomorrow



Product liability without automation

Product liability with automation?

Product liability tomorrow



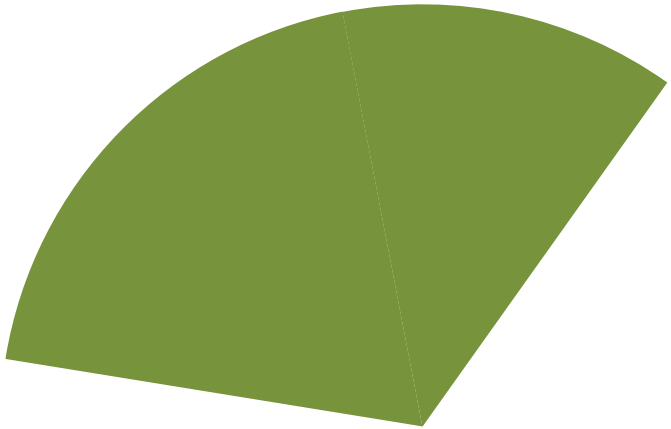
Lack of automation
as the defect

?

Product liability without automation

Product liability with automation?

Product liability tomorrow:
A bigger slice of a smaller pie (of liability)?



Product liability without automation

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?

Product liability with automation?

Who cares?

Developers	Consumers	Society
Liability uncertainty?	Slower deployment?	Slower adoption?
Liability exposure?	Higher cost?	Slower adoption?

Is this testable?

"The prospect of liability for catastrophic accidents resulting from a failure of AVCS will **likely deter** entities from becoming involved with AVCS and **impede its development** unless the federal government adopts some or all of the legislative [limits on liability]."

*Advanced Vehicle Control Systems: Potential Tort Liability for Developers (prepared for FHWA in **1993**)*

https://upload.wikimedia.org/wikipedia/commons/5/59/DHL-BX08KLD.jpg

https://en.wikipedia.org/wiki/File:Tessie_Reynolds_02.jpg

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