Automotive Cybersecurity

Risks and Challenges

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Hacks in the Headlines

NOKIA 'PAID BLACKMAIL HACKERS MILLIONS'

Mobile Phones

Source: BBC

ANTHEM INC. SPENDS $50 MILLION A YEAR AND EMPLOYS 200 PEOPLE TO KEEP ITS INFORMATION TECHNOLOGY SECURE

Healthcare

Source: IBJ.com

CRITICAL INFRASTRUCTURE COMMONLY HIT BY DESTRUCTIVE CYBER ATTACKS, SURVEY REVEALS

Infrastructure

Critical infrastructure organisations are commonly targeted by cyber attacks aimed at manipulating equipment or destroying data, a survey reveals.

Source: ComputerWeekly.com

TARGET SAYS CREDIT CARD DATA BREACH COST IT $162M IN 2013-14

Retail - Groceries

Source: techcrunch.com

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Why is this Relevant?

The product or service is irrelevant.
Hackers focus on the outcome.

Historically, automotive was not a target.
There was **no cybersecurity concern**.

Connecting cars to the IoT makes both the **vehicles** and **vehicle manufacturers potential targets**.

We cannot assume hackers want to take remote control of a connected vehicle.

Single-attack-point / single-countermeasure cases are rare.

Financial impacts can be huge:
$100 millions or billions!

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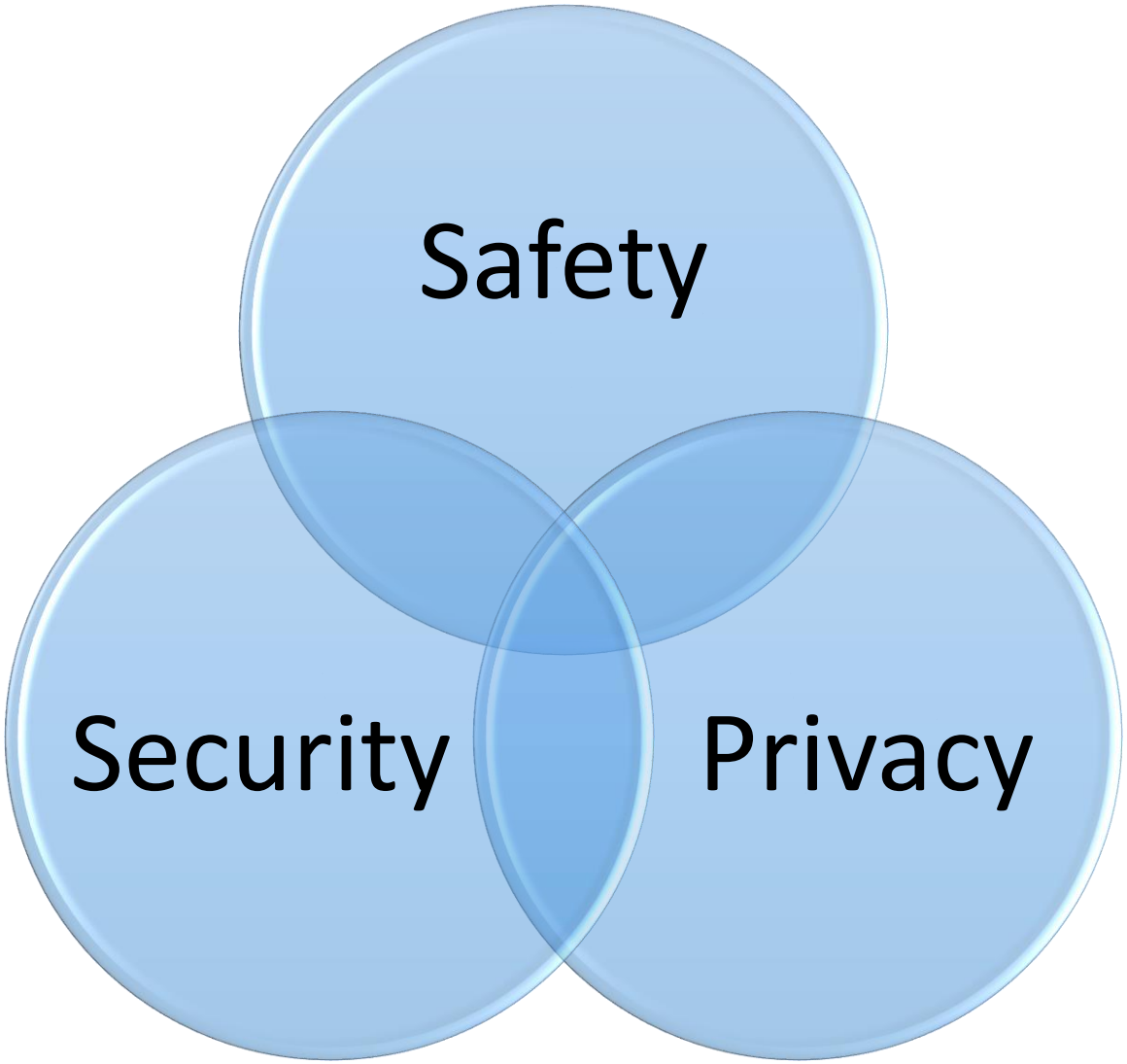
What is Security of a Connected Car?



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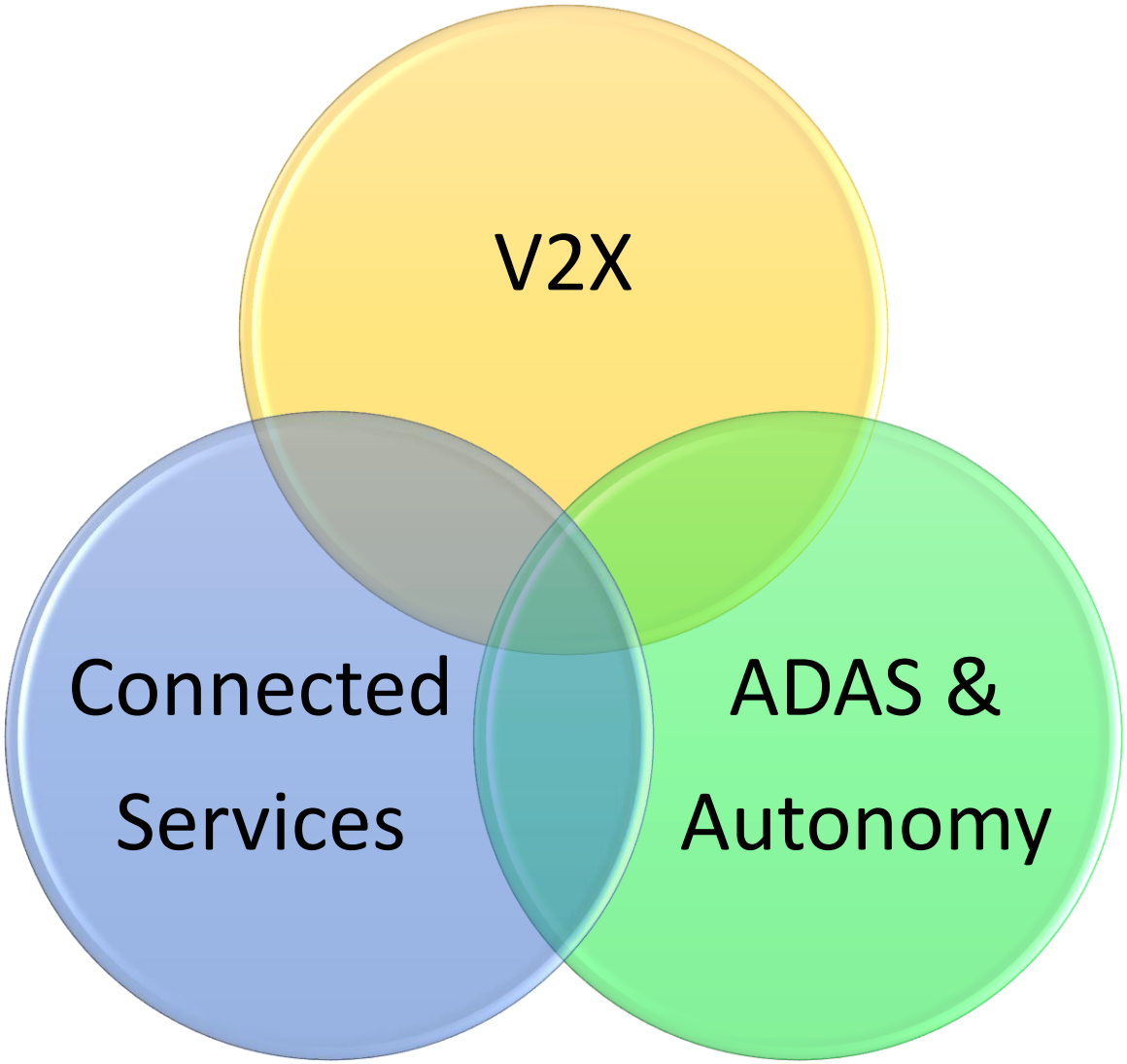
Where are the Security Risks?



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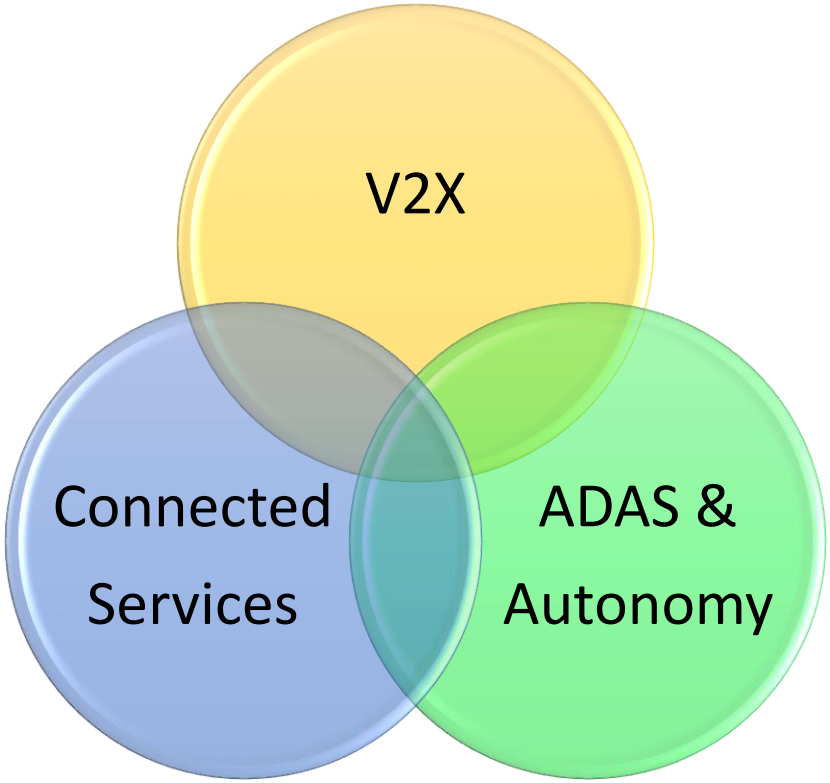
Where are the Security Risks?

Technology centric

Telematics/Connected Services
- Absence of security standards
- Geographic coverage

ADAS/Autonomous
- Emerging technology still being developed
- Sophistication & speed of processing algorithms

V2X Services
- Performance
- Security, safety (& privacy) trade-offs
- Pilot projects still proving the technology



Use-case centric

Penetration of software updates

Communications latency in congested areas

GPS accuracy in tunnels or 'urban canyons'

Granularity of map data

Clock accuracy – Tidal Lanes

Differentiation between:
- False Positive
- Denial of Service
- Malicious Attack

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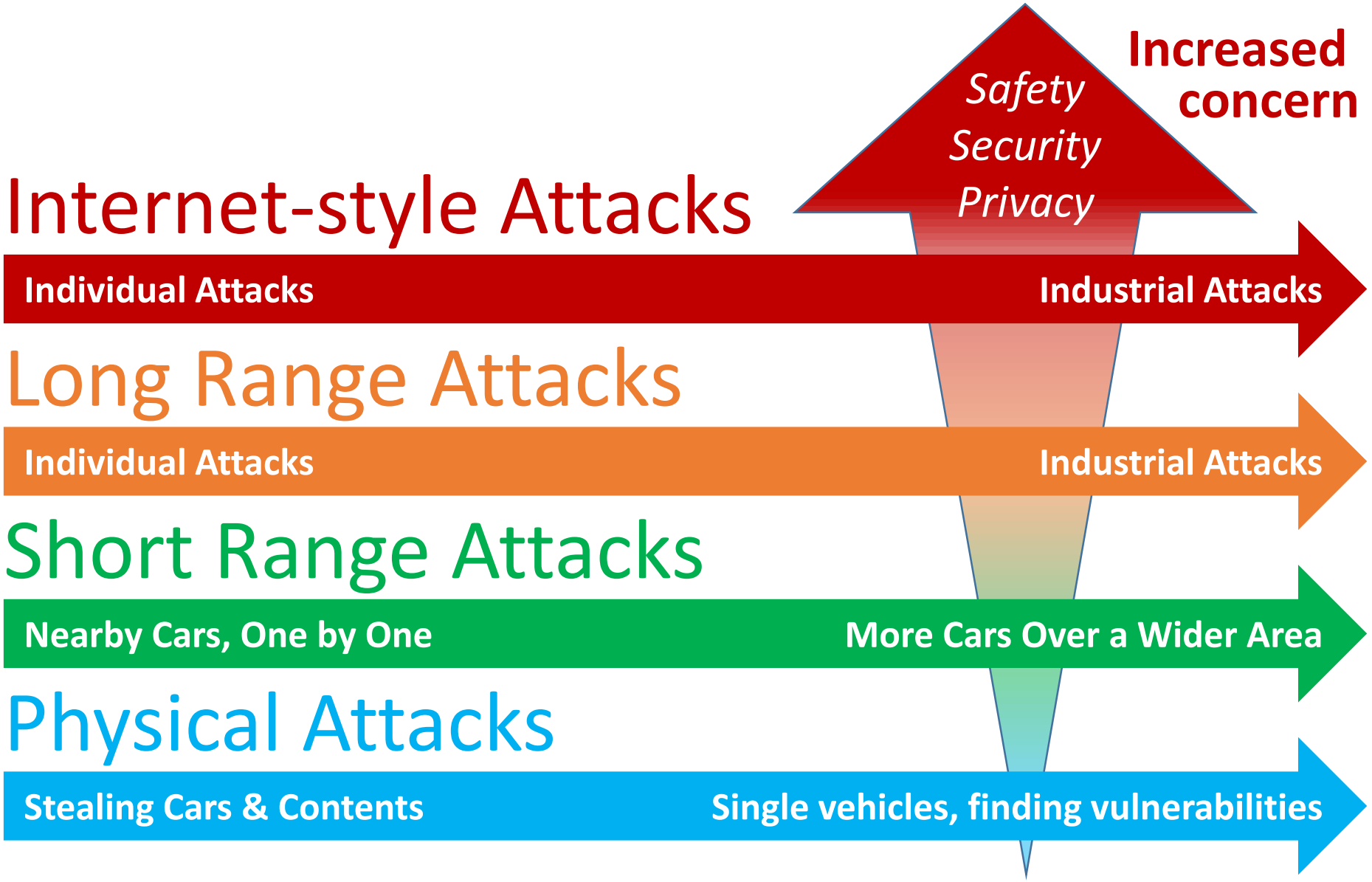
Evolution of Automotive Threats



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Business Challenges

Myth: Hacking is a technical problem, so it needs a technical solution

- **Fact: Hacking is a business problem that needs a business solution**

Guidelines, Processes & Standards

(alone)

≠

(always)

Success

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Business Challenges

Understand (remember) the scope of Cyber-security

- Any system
- Any interface
- Any part of the eco-system
- High profile researcher-based hacks are not necessarily representative of real world threats

Security is for life, not just for launch

- Counter-measures must evolve as threats evolve
- OTA updates are a necessity

Sustainable business model for key management infrastructure

- Who pays for a V2X SCMS

Safety and Security (and Privacy) may be a trade-off

- May vary by region

Financial Impact of getting it wrong could be massive

- Corporate Responsibility and Liability will become a key driver
- ***Negligence*** and ***Absolute Liability*** will be applied to Connected Cars

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Positives

V2X

- Significant resources already deployed (financial/intellectual/pilots)
- Key management infrastructures well understood (if undecided)

ADAS/Autonomy

- Progress on sensor fusion and processing algorithms
- Understood that safety needs security (and vice-versa)

Connected Services

- Political will in USA to promote sharing and standards
- Hacks remain ‘proof of concept’ demonstrations

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Challenges

V2X

- Verification speed vs crypto level
- Sustainable business models for key management infrastructures

ADAS/Autonomy

- Differentiation between false positives, denial of service and malicious hacks

Connected Services

- Attack surfaces still open enabling (relatively) un-sophisticated attacks
- Culture of secrecy (source code & algorithms)

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Conclusions

Secrecy does not ensure security

- Proprietary solutions are not secure
- The quality of your (supplier) code is the quality of your brand

OEMs will be legally liable for all software in their vehicles

- Independent vulnerability assessments will be vital
- A lack of knowledge or awareness is no defence

Cyber Security intelligence needs to be shared and collaborative

- Cyber threats cut across products and companies
- Cyber threats cut across conventional boundaries, sectors and geographies

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A Final Thought…