SAS Global Event Series
IIC Security –
Automotive Trustworthiness

Feb 15, 2019
Intelligent Transportation Systems

Automotive Trustworthiness: The Road to the Future
<table>
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<tr>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
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</thead>
<tbody>
<tr>
<td>Mechanization, water power, steam power</td>
<td>Mass production, assembly line, electricity</td>
<td>Computer and automation</td>
<td>Cyber Physical Systems</td>
</tr>
</tbody>
</table>

The 4 Industrial Revolutions (by Christoph Roser at AllAboutLean.com)
An illustration from the 1918 Scientific American article “The Motor Car of the Future.” Image Credit: Scientific American

Hello Me!

Welcome to 2018.

From yourself in 1918.
Tokyo in 1940
1940’s Vision of Tokyo in 2011
The road is a dangerous place!

1831 cartoon, warning about road troubles of the future.
### Fatality risk of passenger per mode of transport in European Union

<table>
<thead>
<tr>
<th>Transport mode used by user</th>
<th>Fatalities per billion passenger kilometers</th>
</tr>
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<tbody>
<tr>
<td>Airline passenger</td>
<td>0.101</td>
</tr>
<tr>
<td>Railway passenger</td>
<td>0.156</td>
</tr>
<tr>
<td>Bus/Coach occupant</td>
<td>0.433</td>
</tr>
<tr>
<td>Car occupant</td>
<td>4.450</td>
</tr>
<tr>
<td>Powered two-wheelers</td>
<td>52.593</td>
</tr>
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</table>

#### Fatality risk ratios for transports

<table>
<thead>
<tr>
<th></th>
<th>Airline passenger</th>
<th>Railway passenger</th>
<th>Bus/Coach occupant</th>
<th>Car occupant</th>
<th>Powered two-wheelers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powered two-wheelers</td>
<td>520</td>
<td>337</td>
<td>121</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>Car occupant</td>
<td>44</td>
<td>28.5</td>
<td>10</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Bus/Coach occupant</td>
<td>4.3</td>
<td>2.8</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Railway passenger</td>
<td>1.5</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Airline passenger</td>
<td>1</td>
<td></td>
<td></td>
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</tbody>
</table>

Sources: Intermediate report on the development of railway safety in the European Union, European Railway agency; EU transport in figures (Statistical Pocketbook 2012), DG MOVE 2012, European Commission
Big Picture

• The future is bright with great potential
• One incident can abruptly bring it to a halt
• Safety is paramount
• Reliability is the business model
• Privacy is coming fast
This is one problem, not five distinct problems.

Do not treat them so.
Connected Vehicles: Data is the New Currency

Content restricted to IIC Members
Not for External Publication
Vehicle Electrification: Going Green, Greener, Greenest
Autonomy: the promise of the future
This Changes Everything!
Predictions are like dogs,
Everyone loves them,
But they all stink!!

Advertisement from the 1950’s to 1960’s
But some predictions aren’t all that bad
Can there be safety without security?

Today, functional safety certification does NOT include cyber security testing.
Let’s Start Off Small

• Use Cases for Trustworthiness
• Best Practices
• Assure Safety
• Assure Reliability
• Assure Privacy
• Assessment of Claims (Assurance Cases)
• Standards and Certification
Automotive Considerations

Cyber Endpoint

Communications/Connectivity

Cyber Management

Cyber Monitoring
Cyber Security Assessment Process

Cyber Security Assessment
• Threat analysis and Remediation Analysis (TARA)
• Risk assessment
• Vulnerability analysis
• Cybersecurity concept
• Validation specification
• Cyber security case report
• Test reports
• Reuse analysis
• Effectiveness Judgement Guidance
Automotive Standards Related to Trustworthiness

- ISO 16845 – CAN Conformance Test (Control Area Net)
- ISO 14229-1 – UDS (Unified Diagnostic Service)
- ISO 11898-1/2 – CAN – Physical and Datalink Layers
- ISO 26262 – Road Vehicles Functional Safety
- ISO/SAE 21434 – Road Vehicles Cyber Security Engineering
- SAE J3101 – Hardware-Protected Security for Ground Vehicle Applications
- SAE J3061 – Cybersecurity Guidebook for Cyber-Physical Vehicle Systems
Get Involved with the IIC:
Purdue Autonomous EV Go Cart Race Challenge

Held in the Indianapolis 500 Infield during the time trials. Fully autonomous cart race with dynamic obstacles in 2019, and race with multiple carts on the track in 2020.
Unintended Consequences?

This can’t happen. Again.
Kids today don’t even want to get a driver’s license...

Much less ever own a car.
Automobiles Evolve

Related Industries evolve as well

Got Insurance?
The Industry does not Evolve in Isolation
Call to Action!

It will get built, ugly as it may be.

But at least we should build it to be safe, reliable, and secure.
The Fourth Industrial Revolution

1st: Mechanization, water power, steam power
2nd: Mass production, assembly line, electricity
3rd: Computer and automation
4th: Cyber Physical Systems

The 4 Industrial Revolutions (by Christoph Roser at AllAboutLean.com)
Industrial Technologization Trend

- First Industrial Revolution (1784)
- Second Industrial Revolution (1870 - 1914)
- Third Industrial Revolution (1969)
- Fourth Industrial Revolution (2011)
- Fifth+ Industrial Revolution (2023)

Based on The 4 Industrial Revolutions (by Christoph Rohrer at AllAboutLean.com) and Industry 4.0: The Heart of European Investment According to PwC (by Detra Salfi)
Thank You
Speaker Bio
In his role as the Vice President and Chief Architect of Cyber Security, Sven Schrecker leads the division to address Cyber Security within the greater transportation vertical. He consults with Automotive OEMs and Tier 1/2 Suppliers to ensure Cyber Security of the vehicles and parts. He represents these companies to their supply chain, both up and down the chain, to negotiate proper cyber security solutions, roadmap, and timelines. His current industry-wide goals are to address pre-OTA Update integrity issues, legacy vehicle cyber security retrofits, and to work with standards organizations to properly define the cyber security requirements with the automotive vertical.

Before joining LHP, Sven was the Chief Architect for IoT Security Solutions at Intel Corp. for nearly 15 years, where worked on internal and external programs to further the security capabilities in hardware, software, and the difficult to define grey area in between. He was responsible for open, standards-based platforms to enable end-to-end IoT security strategy across both existing (brown field) and new (green field) technologies, to demonstrably increase security focused at Embedded and Industrial deployments across all IoT verticals.

Sven was also the Principal Investigator of the US Dept. of Energy research program addressing Enhanced Security in Power System Edge, leading a group of partnering industrial companies to provide continuous and autonomous reduction of cyber-attack surface for energy delivery systems. Under this CEDS program, his innovative work is deployed in facilities across the country and is been showcased in a number of industrial-related events both domestically and internationally.

Sven is also the Founding Chair of the Industrial Internet Consortium (IIC) Security Working Group (SWG). He attended the first meeting of the IIC in Washington DC in March 2014 and became the chair soon after. He is the primary author of the Industrial Internet Security Framework which is the seminal document that lays the foundation for security, and trustworthiness, in the Industrial Internet of Things (IIoT), and is leading the team that is writing a technical paper on Automotive Trustworthiness. He Chairs the Automotive Security Task Group and co-chairs the Security Liaisons Task Group (with Industry 4.0 co-chair from Bosch) as well as the Security Liaisons Contributing Group.

Sven is the author of numerous security publications and has contributed to dozens of articles, blogs, podcasts and interviews. He is listed as an inventor on over four dozen security-related patents either pending or granted and was selected as at Top 50 Innovator of 2016 by Smart Industry magazine.