THE INTERSECTION OF INDUSTRIES AND IOT INNOVATION
The global conference and exhibition where strategists, technologists, developers and implementers connect, putting IoT into action across industry verticals. The future of business starts here.
The Machine Revolution
Technological, Business, and Cultural Impacts of Intelligent Transportation

Sven Schrecker
VP, Cyber Security
LHP Engineering Services
Intelligent Transportation Systems

Automotive Trustworthiness: The Road to the Future
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)
Hello Future Me!

Did I Predict 2019 Correctly?

-- From myself 100 years ago.

An illustration from the 1918 Scientific American article “The Motor Car of the Future.”

Image Credit: Scientific American
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>
</thead>
<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>
</tbody>
</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>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Airline passenger</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
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</tr>
</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

Pieces of a Larger Puzzle

• 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. Treat them so.
Connected Vehicles: Data is the New Currency
Vehicle Electrification: Going Green, Greener, Greenest
Put it all Together: This Changes Everything!
Advertisement from the 1950’s to 1960’s
But some predictions aren’t that far off

Intel Autonomous Car Marketing
But is This Technology Safe?

Can there be safety without security?

Today, functional safety certification does NOT include cyber security testing.
Security Considerations

- Cyber Endpoint
- Communications/Connectivity
- Cyber Management
- Cyber Monitoring
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 Engineering
- 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
Cyber Security Attack Surface Assessment
Come See Our Cyber Cart Demo:
Functional Safety and Cyber Security in IIC Booth #1239

- 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.
Industry Doesn’t Evolve in Isolation
The Industry Evolves

Got Insurance?
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.
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Internet of Things World

Thank You!
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.