AUTOMATED VEHICLES SYMPOSIUM
Enabling Technologies: Sensing & Perception

Dr. Allan Steinhardt, AEye Chief Engineer
ABOUT AEYE

- Founded: 2013
ABOUT AEYE

- **Founded**: 2013
- **HQ**: Pleasanton, CA
ABOUT AEYE

- **Founded:** 2013
- **HQ:** Pleasanton, CA
- **Solution:** Advanced vision system that “pre-fuses” computer vision and solid state LiDAR to enable newfound vision intelligence in autonomous vehicles
ABOUT AEYE

- **Founded:** 2013
- **HQ:** Pleasanton, CA
- **Solution:** Advanced vision system that “pre-fuses” computer vision and solid state LiDAR to enable newfound vision intelligence in autonomous vehicles
- **Mission:** Safe, reliable vehicle autonomy
ABOUT AEYE

- **Founded:** 2013
- **HQ:** Pleasanton, CA
- **Solution:** Advanced vision system that “pre-fuses” computer vision and solid state LiDAR to enable newfound vision intelligence in autonomous vehicles
- **Mission:** Safe, reliable vehicle autonomy
- **E-Team:** Seasoned execs from DARPA, Lockheed, NASA, Northrop, US Air Force, VLSI
ABOUT AEYE

- **Founded:** 2013
- **HQ:** Pleasanton, CA
- **Solution:** Advanced vision system that “pre-fuses” computer vision and solid state LiDAR to enable newfound vision intelligence in autonomous vehicles
- **Mission:** Safe, reliable vehicle autonomy
- **E-Team:** Seasoned execs from DARPA, Lockheed, NASA, Northrop, US Air Force, VLSI
- **Funding:** $16M Series A from Kleiner Perkins, Intel Capital, Airbus Ventures
Enable machines to navigate safely with an objective purpose in mind.
Enable machines to navigate safely with an objective purpose in mind

Constraints:
- Limited Processing
Enable machines to navigate safely with an objective purpose in mind

**Constraints:**
- Limited Processing
- Lower quality sensors
Enable machines to navigate safely with an objective purpose in mind

**Constraints:**
- Limited Processing
- Lower quality sensors
- Limited data - due to rapid transit
ROBOTIC VISION
The Role in Vehicle Autonomy

Enable machines to navigate safely with an objective purpose in mind

Constraints:
• Limited Processing
• Lower quality sensors
• Limited data - due to rapid transit
• Quick reaction time - low latency
**THE CHALLENGE:** Wildlife

**Volvo admits its self-driving cars are confused by kangaroos**

Company's animal detection system can identify and avoid deer, elk and moose, but not yet to work against the marsupials' movements.

---

**Watch Out, Bambi: Self-Driving Car Coming Through**

Fully self-driving cars will need to handle lists of variables: Harassment-prone humans, temporary detours, and animals in the road, to name just a few.

---

**Avoiding Squirrels and Other Things Google's Robot Car Can't Do**

Volvo's self-driving car is unable to detect kangaroos because hopping confounds its systems, the Swedish carmaker says.
THE CHALLENGE: Forensics

**Intelligent Machines**

**The Financial World Wants to Open AI's Black Boxes**

Some of the most powerful machine-learning techniques work in mysterious ways, which is a problem if you need to explain a decision to customers.

By Will Knight  April 13, 2017

Powerful machine-learning methods have taken the tech world by storm in recent years, vastly improving voice and image recognition, machine translation, and many other things.

**Intelligent Machines**

**The Dark Secret at the Heart of AI**

No one really knows how the most advanced algorithms do what they do. That could be a problem.
THE CHALLENGE: Latency
A Better Way of Developing Autonomous Vehicle Solutions

Wesley Shao
Baidu USA
Paradigm shift of autonomous driving in the AI era
Win-win ecosystem

Customer

Commercial Releases

Open to Public

Partners

Developer Community

Baidu
Apollo 1.0
Closed Venue Autonomous Driving
The **apollo** Kit from **AUTONOMOUSTUFF**

Off-the-shelf, ready-to-use 1.0 reference vehicle and hardware

Lincoln MKZ Hybrid

http://autonomoustuff.com/product/baidu-apollo/

- Nuvo-5095GC Industrial PC
- NovAtel SPAN-IGM GNSS Receiver
- ESD CAN Card
- NovAtel VEXXIS GNSS-502 Antenna
THANK YOU