CyberTruck Challenge

Connecting next generation talent with the heavy-duty industry to keep vehicles secure.

Can Cyber Attacks Lead to Kinetic Results?

and how can we tell?

Heavy Vehicle Cybersecurity

- Truck crashes are a big deal (80,000 lb at 75 mph).
- Trucks and Busses are critical infrastructure
  - Transport of high-risk/high-value cargo
  - Just-in-time inventory control
- Known and unknown attack vectors

The Cybersecurity Talent Gap =

https://www.securitymagazine.com/articles/90182-the-cybersecu

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The Cybersecurity Talent Gap = an Industry Crisis

Who will address the cybersecurity challenges for heavy vehicles?
Or
autonomous systems?


CYBERTRUCK CHALLENGE
2019
MEDC
NMFTA
pw n3d
0x95 0x77 0xA7 0x86 0x07 0x52 0x85 0xA6 0x86 0xA7 0x77
0xE6 0x97 0xE7 0x52 0x25 0x66 0x97 0x97 0xA6 0x77 0x87

Mission & Purpose

- Help **develop the next generation workforce** by bringing awareness, excitement, professional involvement, and practicum-based training to the heavy vehicle cyber domain.
- Help **establish community of interest for heavy vehicle cyber** that transcends individual companies or departments and reaches across disciplines and organizations to make a more universal and experienced base of engineers and managers.

What we do at the CyberTruck Challenge

- We teach college students (> 50% graduate students) to hack modern commercial vehicles
- We form assessment teams including:
  - 6-8 students
  - 3-4 manufacturers
  - 2-3 suppliers
  - 2-3 academics
  - 1-2 hackers
- We provide excellent training from industry recognized cyber experts
- The teams conduct targeted and open-ended assessments on modern (2018 or newer) commercial vehicles
- We facilitate human networking and provide opportunities for mentor-protégé relationships

CyberTruck Challenge 2019 Schedule

	Sunday, 23 June	Monday, 24 June		Tuesday, 25 June		Wed., 26 June	Thursday, 27 June	Friday, 28 June	Time
		Group A	Group B	Group A	Group B				
Before 0700	Site Closed	Site Closed		Site Closed		Site Closed	Site Closed	Site Closed	Before 0700
0700-0800		Free		Free		Free	Free	Free	0700-0800
0800-0900		Breakfast/Registration		Breakfast		Breakfast	Breakfast	Breakfast	0800-0900
0900-1000		Welcome and NDA		Wireless	CANBUS	**Assessment**	**Assessment**	Student Team Briefs	0900-1000
1000-1100		Crypto	Truck Systems						1000-1100
1100-1200		CANBUS		Hardware RE				Review*	1100-1200
1200-1300		Lunch		Lunch		Lunch	Lunch	Lunch	1200-1300
1300-1400		CANBUS (cont'd)	Truck Systems	Hardware RE (cont)	Wireless	**Assessment**	**Assessment**	Hosted "Tour of Greater Detroit for Career and Fun"	1300-1400
1400-1500			Android						1400-1500
1500-1600		Truck Systems	Software RE	Software RE	Crypto				1500-1600
1600-1700					Hardware RE				1600-1700
1700-1800									1700-1800
1800-1900	Informal Welcome Reception (offsite)	Android				Dinner	Dinner		1800-1900
1900-2000		Dinner		Dinner		**Assessment**	Free		1900-2000
2000-2100		Site Closed		Tool Talk*					2000-2100
2100-2200	Site Closed								2100-2200
After 2200				Site Closed		Site Closed	Site Closed		After 2200

*Survey *Survey

Legend

Lecture / Demo	All participants
Freightliner Side	Interactive lecture and activities
Peterbilt Side	Interactive lecture and activities
Meals	Meals will be catered on-site
"Hacking"	On vehicle assessments
Free	Can hack, study, rest, leave, etc.
Site Closed	No access the facility
Off Site	Hosted tour of Greater Detroit

Capture the Flag events focused on heavy vehicles will be available until close of **Tuesday** evening led by Ben Gardiner [NMFTA].

Topic	Instructor, Affiliation
Welcome and Review	Karl Heimer [MEDC] & Sponsor Representatives
CANBUS	Robert Leale, [CANBusHacks]
Wireless	David Connett [Splunk]
Software Reverse Engineering	Aaron Cornelius [GRIMM]
Truck Systems	Jeremy Daily [The University of Tulsa]
Hardware Reverse Engineering	Bill Hass [Cybersecurity Researcher]
Android	Eduardo Novella [NowSecure]
Cryptography	Ben Gardiner [NMFTA]
Tool Talk	John Cotner [NXP]
Army Vehicles and Cybersecurity	Jeff Jaczkowski [Army]

Plans for 2020 (and beyond)

- Hardware Reverse Engineering
- Software Reverse Engineering
- J1939 and CAN Bus Networking
- Android Reversing
- Wireless and Software Defined Radio
- Cryptography
- Truck Systems and Diagnostics
- Open and Creative Assessments

78292 Federal Register / Vol. 80,

DEPARTMENT OF TRANSPORTATION

Federal Motor Carrier Safety Administration

49 CFR Parts 385, 386, 390, and 395

[Docket No. FMCSA–2010–0167]

RIN 2126–AB20

Electronic Logging Devices and Hours of Service Supporting Documents

AGENCY: Federal Motor Carrier Safety Administration (FMCSA), DOT.

ACTION: Final rule.

SUMMARY: The Federal Motor Carrier Safety Administration (FMCSA) amends the Federal Motor Carrier Safety Regulations (FMCSRs) to establish: Minimum performance and design standards for hours-of-service (HOS) electronic logging devices (ELDs); requirements for the mandatory use of these devices by drivers currently required to prepare HOS records of duty status (RODS); requirements concerning HOS supporting documents; and measures to address concerns about harassment resulting from the mandatory use of ELDs. The requirements for ELDs will improve compliance with the HOS rules.

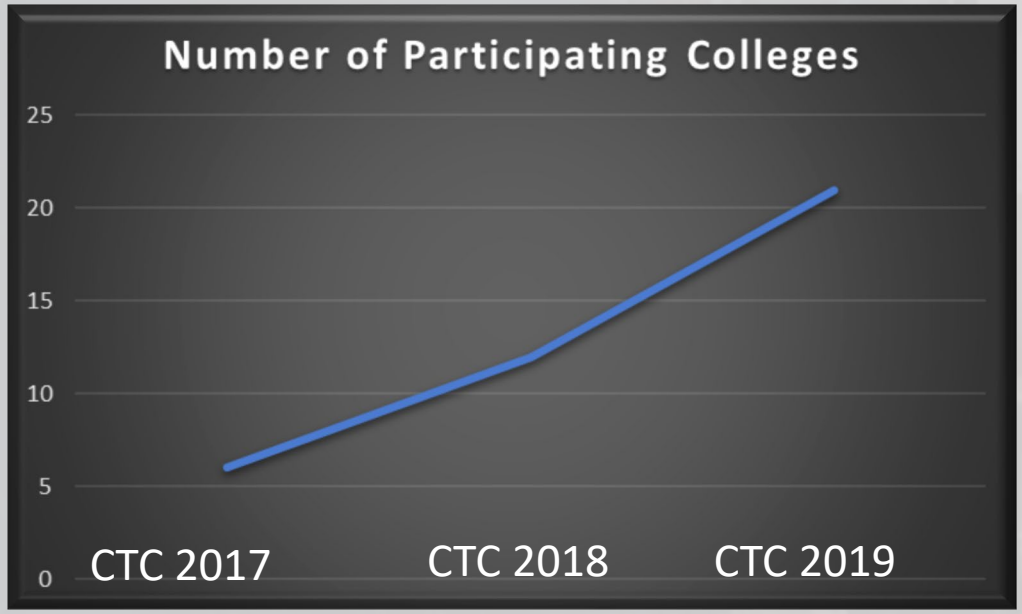
How do we measure success?

Industry sponsors have demonstrated product cybersecurity improvements

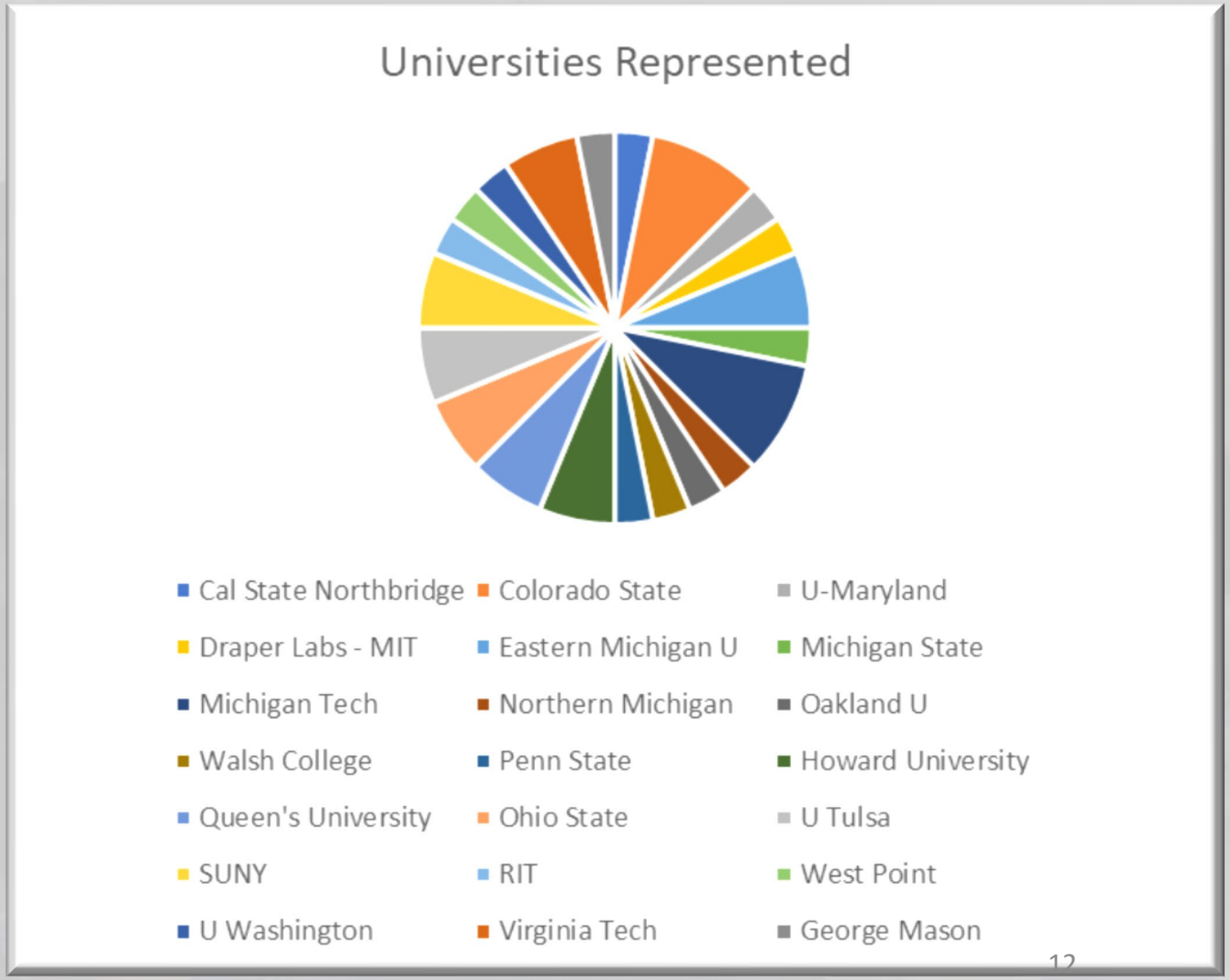
Students are hired into the industry

Participation growth

Student Participation & Growth



- Universities increasing by ~6/year
- Several developing vehicle cyber programs
- Others lack programs, but individual students show interest
- Few schools drop out after introduction



Class of 2017 (2 Trucks)

Class of 2018 (5 Trucks)

Class of 2019 (6 Trucks and a Trailer)

Class of 2019 (6 Trucks and a Trailer)

Class of 2019 (6 Trucks and a Trailer)

2019 Sponsors

MICHIGAN DEFENSE CENTER
MICHIGAN ECONOMIC DEVELOPMENT CORPORATION

NMFTA
National Motor Freight Traffic Association, Inc.

GEOTAB
management by measurement

omnitracs

OLD DOMINION FREIGHT LINE®

VOLVO
VOLVO GROUP

Cummins®

PACCAR

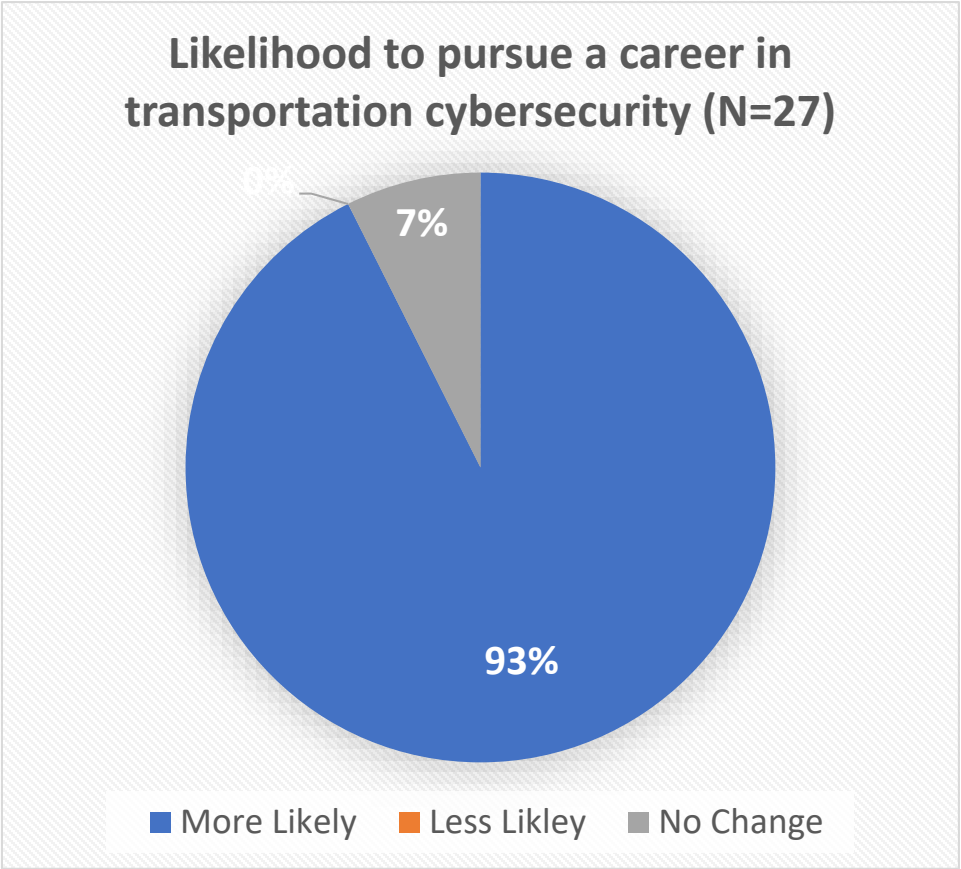
DAIMLER

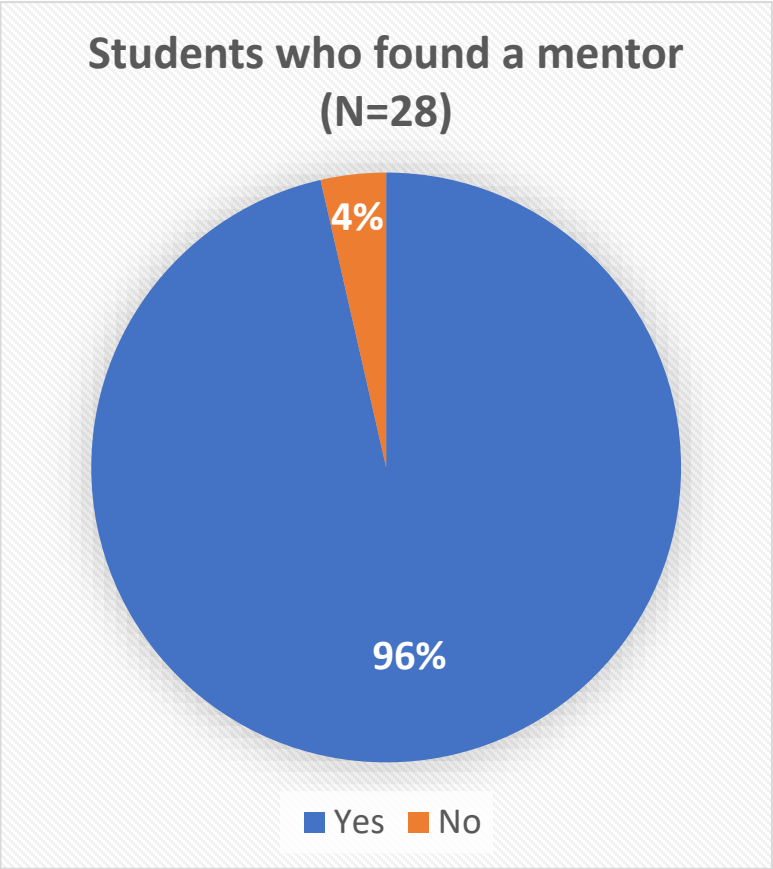
THE OHIO STATE UNIVERSITY
CENTER FOR AUTOMOTIVE RESEARCH

THE UNIVERSITY of TULSA

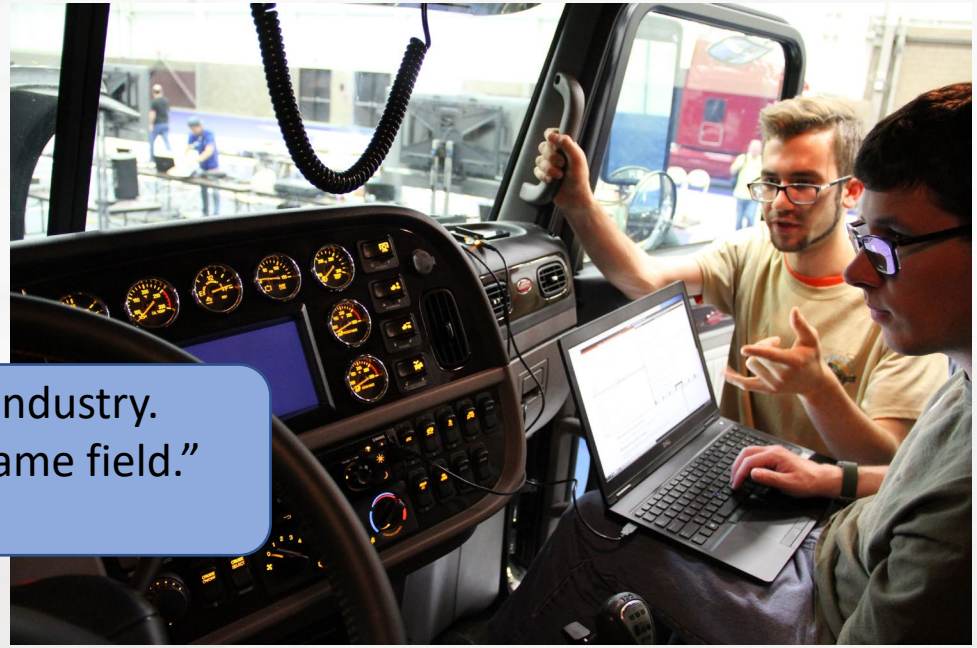
Bendix®

Outcomes – Student Intent & Connections





Outcomes – Student Comments



"The biggest benefit for me was probably talking with all the professionals in industry. Talking to them about what they did just affirmed that I want to work in the same field."
-- John Maag, Electrical and Computer Engineering, Class of 2019

"In one short week I came together with a range of professionals, students, and hobbyists. We spent two days getting a broad crash course in reverse engineering. Then with teams and a mentor, we chose a project or two from a range of levels that make up the various truck systems. It was intense; I was totally engaged; it was one of the most fantastic weeks of my life."
- Zach Aubin, Graduate Student in Computer Science, Class of 2022.

"This experience is amazing. I would never get an opportunity to work with an actual vehicle if it wasn't for the CyberTruck Challenge."

-- Subhojeet Mukherjee, Ph.D. Candidate (CS)

What Can the CyberTruck Challenge Facilitate for Assured Autonomy?

- Talent Generation
- Discovery of Vulnerabilities
  - Cyber Physical
  - Privacy (Forensics and IP)
- Build Trust in a Community
- Identify Systems Level Security Challenges
  - Human
  - Corporate
  - Machine
  - Network
- Models for engagement and tech. transfer for other verticals
- Ethics and Responsible Disclosure
- Testing and Evaluation
  - Can we provide hard real-world reference problems?

SAVE THE DATE

What: CyberTruck Challenge 2020

Where: Macomb Community College Sports & Expo Center
Warren, MI

When: June 21-26, 2020

For more information:
www.cybertruckchallenge.org

Sign up for the mailing list.

Thank you

For more information, please contact

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