Applus IDIADA

Beam Connectivity

CATAPULT Compound Semiconductor Applications

University of Exeter

Swansea University Prifysgol Abertawe

AutoCHERI

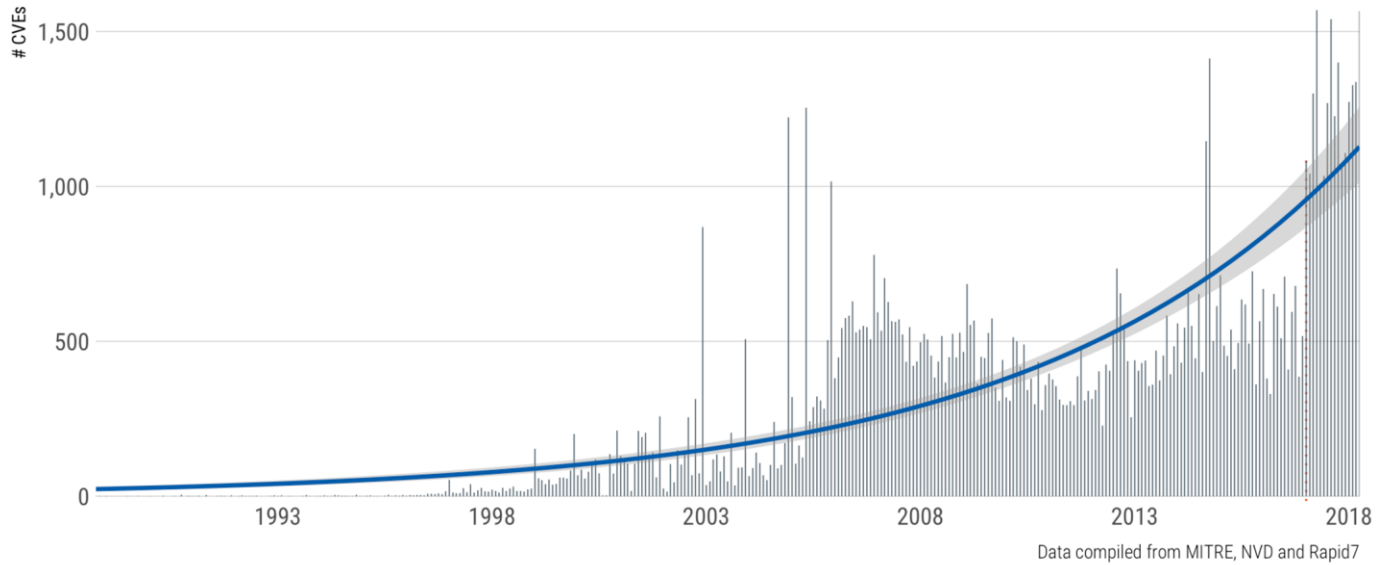
UKRI Business led demonstrator

"Understand performance-security trade-off of CHERI for cyber and safety critical automotive applications"

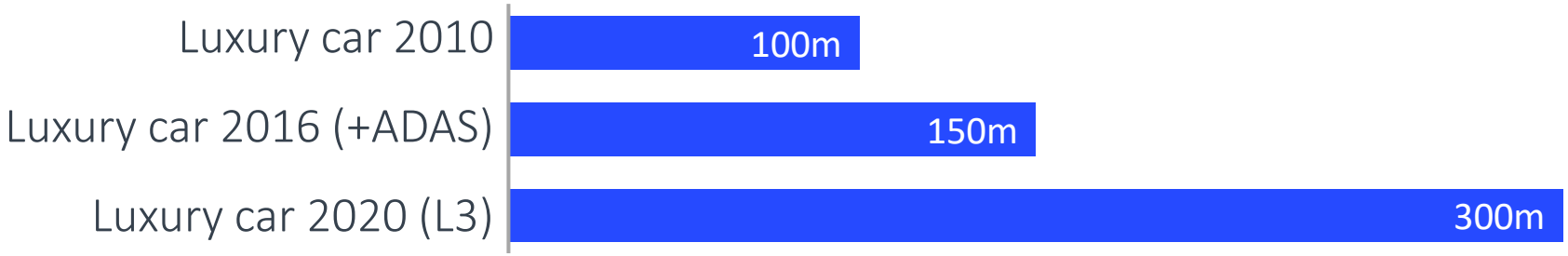
https://autocheri.tech

Increasingly challenging security climate

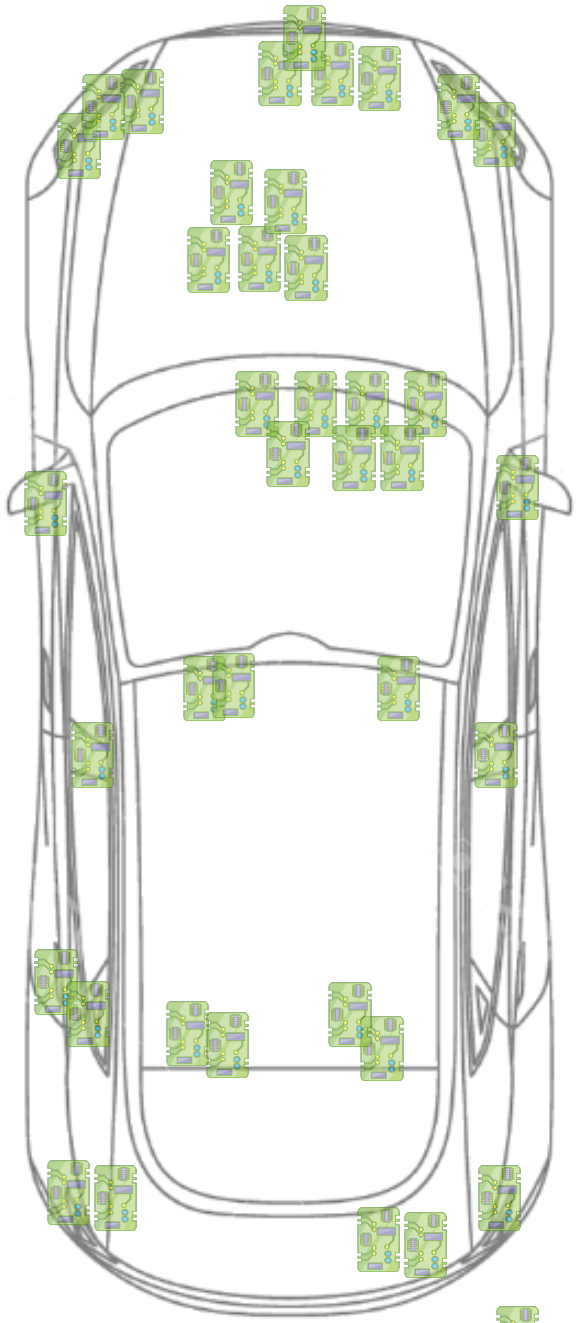
- Vehicle system complexity
- Software complexity
- Supply chain complexity
- Vulnerabilities found
- Geo-political tensions



CVEs registered



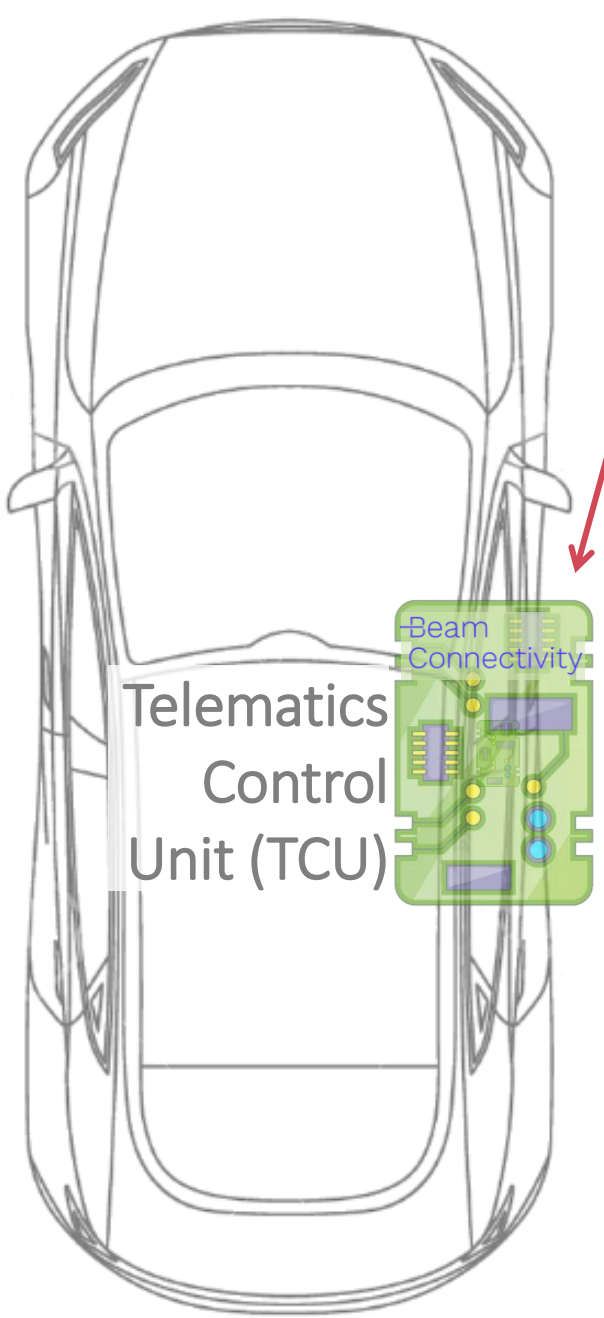
Software lines of code

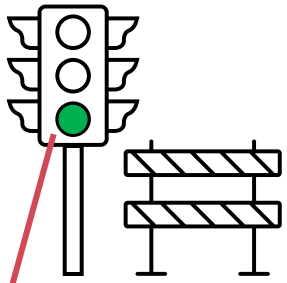


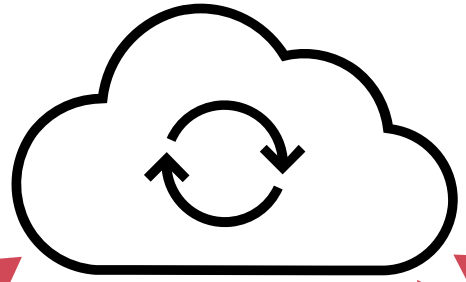
Automotive networks

- Cars = “Data centers on wheels”
- **Today**: 100+ Electronic Control Units (ECUs) in a car
  - One per ‘function’, e.g. windows, locks, heated seats
- **Tomorrow**: Consolidate into < 10 more powerful compute nodes
  - Need isolation via hypervisors, etc.
- Cars run cyber critical & performance sensitive workloads
- Can we apply CHERI to this domain?
- Beam Connectivity: we have a Telematics Control Unit
  - Manages wireless comms and connected car features

Electronic Control Unit (ECU)



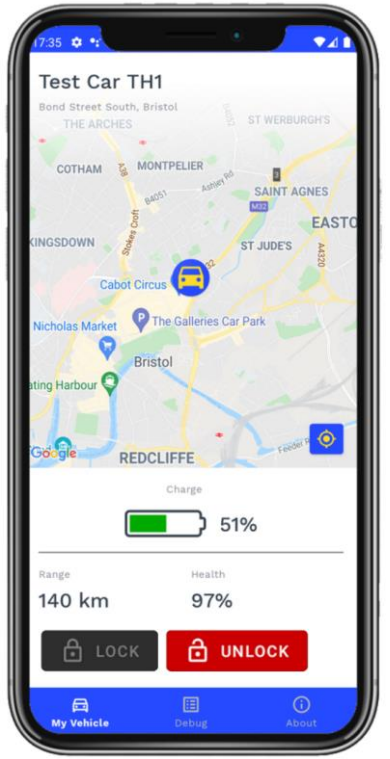




Telematics Control Unit (TCU)

4x Use Cases

- Telemetry data to cloud
- Over-the-air SW update
- Remote control: Lock doors
- V2I: Traffic light advisory



Project strands

✓ Complete
🔄 In-progress
• Up next

Research

- 🔄 Functional requirements
- 🔄 Threat Assessment & Remediation Analysis (TARA)
- • CHERI efficacy as a mitigation for automotive threats

Implementation

- ✓ Port TCU codebase to Morello
- 🔄 Implement new features
- • Benchmark and compare
- • Attack!

Market

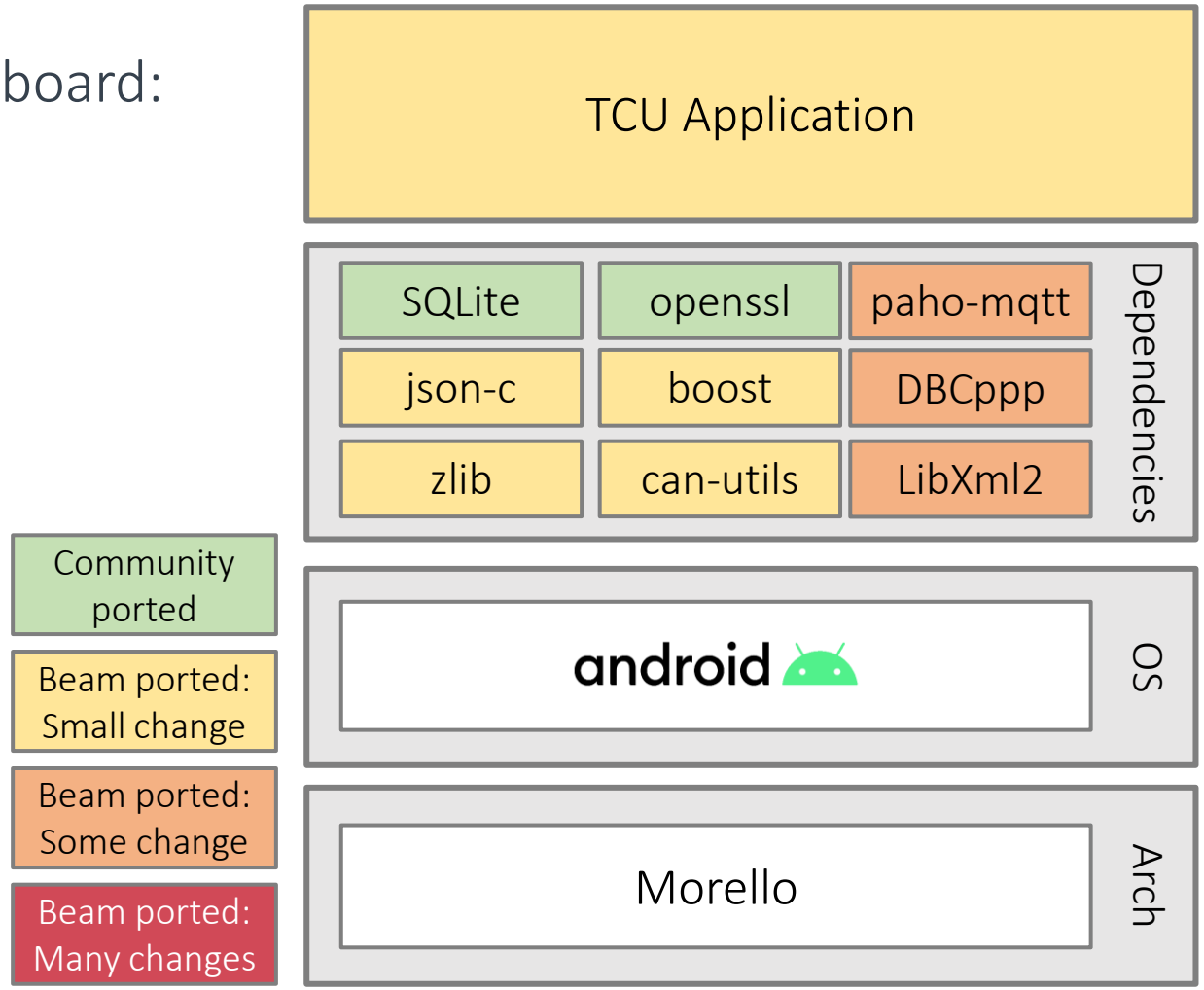
- 🔄 Understand benefits/barriers for adoption in automotive
- • Align CHERI to automotive regulations
- • Understand route to market

Project AutoCHERI

Porting to Morello

- Integrated peripherals with Morello dev board:
  - CAN bus adapter
  - GPS & 4G cellular modems
- “Hello CAN bus” demo app
- Automated CI pipelines
  - Dockerised build environment
  - Build all dependent libraries
  - Build application
- Now implementing new app features

Come see our live demo over lunch



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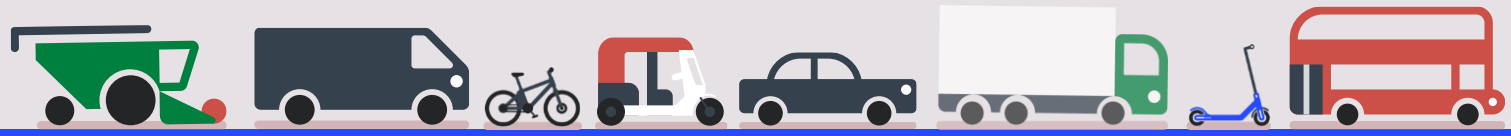
To be continued at
the next DSbD All Hands…



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