Opportunities, Threats and Solutions for Connected Vehicles and Secure Telematics

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Cellport's Innovation History

- Founded in 1993 – Boulder, Colorado
- Charter – Research and Development – Wireless Connectivity Systems in Vehicles

- Telematics Design Leadership
  - Universal Portable Adapter System: 1994
  - Internet Connected Vehicle Prototype: 1996
  - Secure Telematics Framework :2003

The Problem With Cars Today

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Connected EV's Clear the Air
Connected Phones Reduce Distraction

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Connected Vehicles: New Security Challenges

- Car OEMs are racing to connect their vehicles
  - Smart phone to vehicle
  - Vehicle to Web
  - Vehicle to Smart Grid
- But new connections are open paths for malware attacks
  - Phone or web based attack on vehicle systems
  - EV based malware attack on Grid
  - Location aware apps could track drivers

Malware Attacks Threaten Connected Cars

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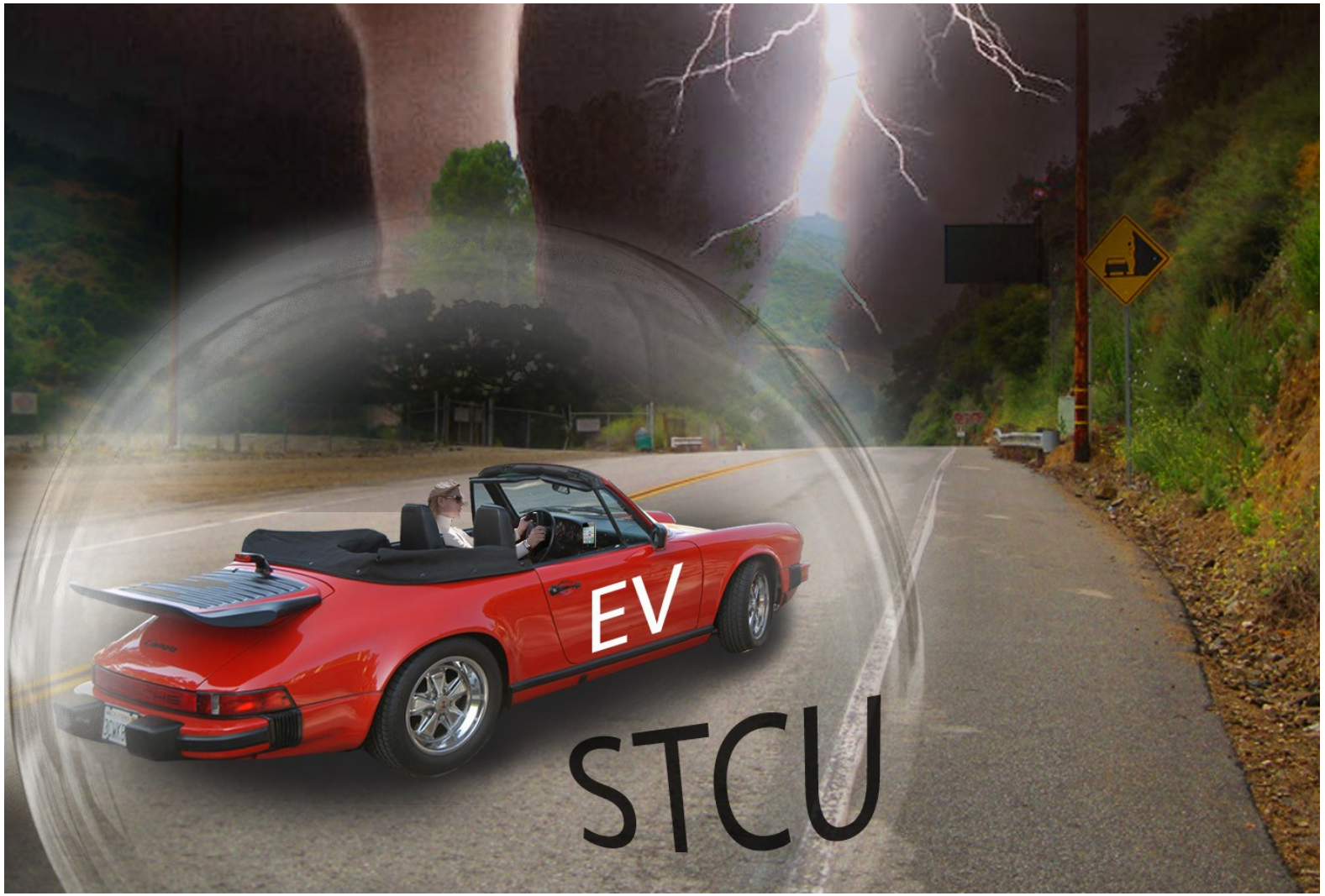
Opportunities for Securely Connected Vehicles

- A modern luxury sedan may contain up to 100 MB of binary code spread across 50-70 networked processors
- Opportunities are unprecedented for
  - Remote access to vehicle data, systems
  - In-car services and entertainment
  - Driver-specific vehicle behavior
  - Context-aware vehicle service availability
  - EV connectivity and transactions
  - Inter-vehicular networks

Secure TCU Protects Vehicle and Grid from Threats



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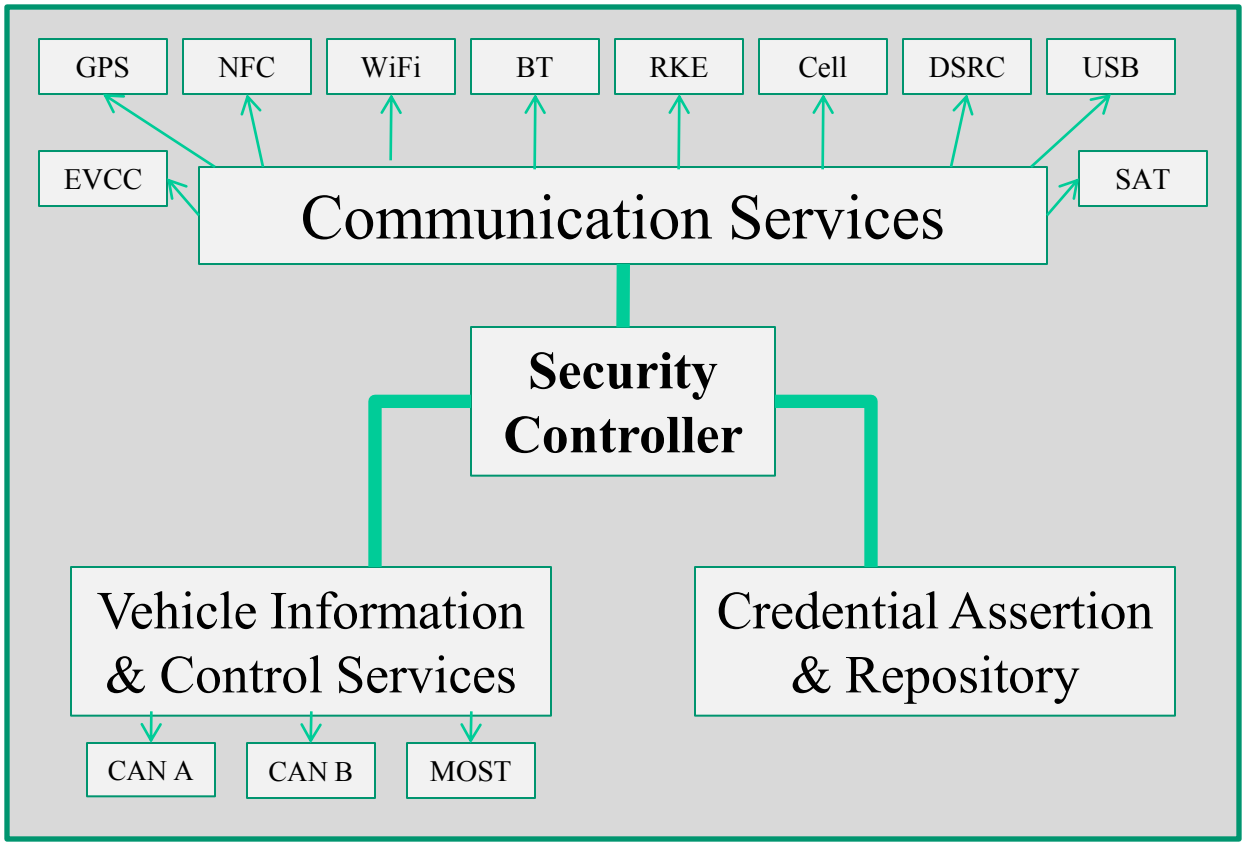
Secure TCU Architecture



Secure Telematics Development System

- Security controller
- Gateway and firewall to vehicle bus
  - Secure Interfaces
    - Cellular
    - Bluetooth
    - WiFi
    - Diagnostic
    - Near field communications
    - EV charging and transactions
    - Phone as drivers' registration
    - USB

Secure Telematics Framework Attributes

- On-board security controller
  - Protects vehicle systems, connected devices and connected systems
  - Gateway for all external links to vehicle
  - Applies established security methods
    - Credential repository
  - Monitors vehicle network activity
  - Grants limited access to vehicle systems based on application type and vehicle status

Secure Telematics System: An Ecosystem is Born

- Smartphone apps for vehicles
  - Context based access to resources
  - Drivers' phone authentication
- Cloud apps for vehicles
- Embedded vehicle apps rely on information and services from the Cloud
- EV charging control and payment
- Vehicle with mobile wallet

Secure Telematics Ecosystem Development Requires Agile Prototype Vehicle Platform

- Cellport's STF Lab
  - Objective: build secure internet connected prototype vehicles
- Likely Development & Test Participants
  - Mobile Carriers
  - Insurance Underwriters
  - Government Organizations
  - Smart Grid developers
  - Mobile Payment Operators

Early Stakeholders in Secure Telematics Ecosystem

- Semiconductor security firms
- Network and application layer security providers
- Smartphone application developers
- Software platform providers
- Government advanced research organizations
- Wireless Industry