

# Poster: Platform for Innovative use of Vehicle Open Telematics (PIVOT)

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**Abstract**—The PIVOT project is an NSF-funded effort to develop a community-based platform intended to catalyze the production and consumption of automotive and heavy duty datasets and associated tools to support the computer science and engineering community pursuing research in vehicle system cybersecurity, intelligent transportation, and smart and connected communities.

As vehicles are becoming more connected and autonomous, telematics and other data from such vehicles is critical to support research and building applications for the vehicles themselves as well as their environment. Such datasets are scarce and limited at best, partly due to the difficulty in collecting them and the privacy considerations that accompany them. Unlocking the vast potential of vehicle applications requires open availability of diverse, high-quality datasets. The University of Memphis, Colorado State University, and USC Information Sciences Institute are collaborating with commercial telematics service provider Geotab to build the Platform for Innovative use of Vehicle Open Telematics (PIVOT), a community-based platform intended to catalyze the production and consumption of automotive and heavy duty datasets and associated tools to support the NSF CISE community and others pursuing research in vehicle system cybersecurity, intelligent transportation, and smart and connected communities [1].

The PIVOT project comprises five pillars:

**Platform.** The robust and reliable hardware and software infrastructure needed to host the data, tools, and services.

**Data.** The curation and sharing of data and contextual information, including community datasets, Geotab telematics data, and new PIVOT CAN loggers to collect data. PIVOT will act as a clearinghouse for community datasets that are produced by others but may not be widely known, such as the ORNL ROAD [2], HCRL datasets [3], ETAS/Bosch SynCAN [4], and Colorado State heavy truck datasets [5]. Geotab telematics data includes data from a small “fleet” of vehicles collecting high-fidelity telematics data with Geotab’s GO9 device, and access

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to Geotab’s Altitude global telematics network and analytics platform [7]. PIVOT CAN loggers are custom devices based on CSU’s CAN Logger 3 [8] that collect and store crowdsourced datasets from passenger cars and heavy trucks.

**Tools.** Common software-based tooling to collect, transform, combine, filter, and visualize the data. This includes CAN log format converters, tools to convert raw CAN into protocol data units, data decoding tools, and CAN data log slicing and filtering tools, among others.

**Services.** Researcher-centric services for sharing, securing, and evaluating datasets. This includes links to community datasets and tools, access to Geotab datasets and analytical tools, and collection, storage, and mirroring of PIVOT crowdsourced CAN logger datasets. It also includes access to PIVOT tools and privacy support services and tools (e.g., anonymization or privacy-enhanced technologies).

**Community.** Community engagement and outreach activities to raise awareness, encourage contributions and use, and elicit requirements and feedback from the research community.

The PIVOT project will enable new, innovative research through access to existing and new, hard-to-get CAN and telematics datasets, tools and add-ons to enhance researcher capabilities, and telematics from millions of vehicles through our commercial collaborator. The project will provide artifacts to educate the next generation of automotive cyber engineers through classes in computer science (networking, security, machine learning, digital forensics) and the industry-sponsored CyberAuto Challenge and CyberTruck Challenge [9] events. The project will also strengthen the community by providing a forum to exchange ideas and resources, and help researchers form and expand collaboration teams.

## REFERENCES

- [1] PIVOT Project: Platform for Innovative use of Vehicle Open Telematics (website), <https://pivot-auto.org/>.
- [2] Real ORNL Automotive Dynamometer (ROAD) CAN Intrusion Dataset (website), <https://0xsam.com/road/>.
- [3] Hacking and Countermeasure Laboratory (HCRL) (website), <https://ocslab.hksecurity.net/welcome>.
- [4] ETAS/Bosch SynCAN, <https://github.com/etas/SynCAN>.
- [5] Heavy Vehicle CAN Data, <https://www.engr.colostate.edu/~jdaily/J1939/candata.html>.
- [6] Geotab GO vehicle tracking device (website), <https://www.geotab.com/vehicle-tracking-device/>
- [7] Meet Altitude, The Home of Actionable Transportation Insights (website), <https://its.geotab.com/altitude/>.
- [8] CAN Logger 3, <https://github.com/SystemsCyber/CAN-Logger-3>.
- [9] CyberTruck Challenge (website), <https://www.cybertruckchallenge.org/>.