UNIVERSITY OF SOUTH FLORIDA

Major Research Area Paper Presentation

SoK: Understanding Security Issues in Vehicle Transportation Systems in a Holistic, Context-aware Manner

by

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For the Ph.D. degree in Computer Science and Engineering

Technology is revolutionizing vehicle transportation systems with the goal to improve efficiency, mobility, safety, and comfort. While there has been research looking into cyber security issues in transportation systems, such efforts are often fragmented, targeting specific segments of the system, and lack a coherent framework that captures the overarching context. The vehicle transportation system is a complex ecosystem of diverse technologies, residing in myriad types of components dispersed over a wide geographic area. Understanding security issues in such systems requires capturing the many ways technologies in the ecosystem may interact. Systematizing security issues that may arise through these interactions will benefit not only the management and operation of such systems, but also the design process of future systems and system components, which are undergoing rapid technological advancement. In this paper we provide such a systemization. Driving force of our effort is an in-depth, six-month embedding in a traffic management center (TMC) of a mid-size city in the U.S., where we gained first hand knowledge of the inner workings of the vehicle transportation ecosystem. This methodology helps to put security analysis into the context of the transportation ecosystem and provides a common platform for communication to help break down the silos existing both in research and in practice.