**Title: Toyota's electronic throttle control system (ETCS) caused sudden unintended acceleration**

Company: Toyota Motor Corporation

Product: Toyota Corolla and Camry’s ETCS

For years, Toyota cars are well-known for their reliability and durability in the car industry. Their most popular models are Corolla and Camry which always satisfy customers’ expectations about their performances as well as affordable prices. There are around 50 million cars are sold every year, so the higher the number shows the higher the prominence of giving priority to human safety.

In 2009-2010, Toyota initiated the recalls of Toyota Camry and Toyota Corolla after getting reports of cars experiencing unintended acceleration. As inspection report, the corruption happens due to the unreasonable quality of ETCS source code which causes task suspensions and unwanted behaviors. The core of ETCS is using a Real-time operation system (RTOS) to manage tasks such as switching of driving mode. Unfortunately, Toyota did not cover this case well in their testing before manufacturing it, so it caused unintended acceleration. Additionally, Barr Group (Software Expert Witness Services) also discovered some inadequate peer code reviews and the absence of memory protection against stack overflow. Indeed, this event did not only affect Toyota’s reputation and the pricy cost of compensation and car maintenance but also caused unwanted accidents related to human life.

My reflection from this story:

It is very important and necessary to code and test corner cases that should cover failures by hardware and software designs. Second, it must make sure that the hardware and software work compatibly. On top of that, peer code reviews and line by line of code need to be done even we are just updating the new model from the available one because changing a variable among thousands of ones still could cause a run-time error of the whole system.

**References:**

<https://en.wikipedia.org/wiki/Sudden_unintended_acceleration>

<https://en.wikipedia.org/wiki/2009%E2%80%932011_Toyota_vehicle_recalls>

<https://www.edn.com/toyotas-killer-firmware-bad-design-and-its-consequences/>

## Peer Review: Eugene Ip

***“Title: Boeing 737 Cockpit Blackout***

***Company: The Boeing Company***

***Product: Boeing 737 NG****On January 8th, 2020, a flight from Iran to Ukraine crashed due to a display bug occurred on the display units when certain instruments approaches a runway directly west. After checking, the Federal Aviation Administration declared that there are various longitudes and latitude values that caused the blackout issue. The bug was caused by a software called "Common Display System Block Point 15". From this bug, The Boeing Company was asked recall all the planes that had this software and notified any that had their flights affected. Although The Boeing Company did not get fined for this mistake, this costed something that was more valuable than money -- 176 people's lives.   
  
This accident made everyone become more careful when it comes to quality checking. Wire connections, as well as the dimensions of the parts are as precise as they can get. They also check that all parts are drilled in properly and applied the proper amount of torque to the nuts. The Boeing Company has improved their standards and specifications so that we can fly safely to travel or meet our beloved ones.   
  
Source:*[*https://www.theregister.com/2020/01/08/boeing\_737\_ng\_cockpit\_screen\_blank\_bug/ (Links to an external site.)*](https://www.theregister.com/2020/01/08/boeing_737_ng_cockpit_screen_blank_bug/)[*https://futurism.com/the-byte/boeing-737-glitch-shuts-down-cockpit-screens (Links to an external site.)*](https://futurism.com/the-byte/boeing-737-glitch-shuts-down-cockpit-screens)[*https://www.seattletimes.com/business/boeing-aerospace/boeing-overhauls-its-quality-controls-more-high-tech-tracking-but-fewer-inspectors/*](https://www.seattletimes.com/business/boeing-aerospace/boeing-overhauls-its-quality-controls-more-high-tech-tracking-but-fewer-inspectors/) ”

Hi Eugene Ip, your post is an interesting topic to read. It is impossible to control a system without a monitor display, and things may get worse when we are far away from the ground where there are no physical roads human can see so that the Boeing may unidirectionally fly and hit to others. The discussion would be more elaborate on “standard of care” if you mentioned more about "Common Display System Block Point 15" bug such as how would it affect the whole system and what happened to the lives of 176 people. Fortunately, the Boeing company overhauls their quality controls so that we don’t need to hear sorry news.