Prototype Version 2

The prototype illustrates the virtual user interface that a vehicle embedded with our scalable cruise control system would have. This interface would be implemented using a touchscreen display. The user interface is split up into three main sections: Following Distance Management (FDM), Simple Cruise Control (SCC), and Automatic Emergency Brake (AEB). SCC and AEB work independently of one another. Therefore, SCC can be enabled with or without the AEB feature being enabled and the AEB can work with or without SCC being enabled. Further, FDM and SCC are coupled with regards to the fact that enabling FDM when SCC is not already enabled, enables the SCC feature. Additionally, FDM functions regardless of whether the AEB feature is enabled or disabled. However, in the case of the AEB feature being enabled with the FDM feature, the AEB will override the following distance system and SCC system in the case of an emergency (when the car approaches too close to the vehicle or object in front of it).

**Following Distance Management:** This feature contains five different virtual buttons: enable/disable, close, medium, far, and extra-far. The enable/disable button enables the FDM feature and SCC feature, if SCC was not already enabled, and defaults to the last used following distance if the FDM feature has been used before. If the feature has not been used, the system defaults to the medium following distance setting. The image displayed in the prototype, that indicates the driver’s view, will change depending on whether the following distance setting is close, medium, far, or extra-far. For example, if the FDM feature is enabled along with the simple cruise control and the user selects the extra-far setting, the red car in the picture (indicating the user) will be farther away from the orange car (representing the leading vehicle) than it would be if the following distance setting was medium.

**Simple Cruise Control:** This feature contains five virtual buttons: enable/disable, +, –, cancel/suspend, and resume speed. The enable/disable button either engages or disengages the simple cruise control system. If the system is enabled, the cruise control speed is set to the current speed of the vehicle if the vehicle is traveling greater than 25 mph; otherwise, the simple cruise control feature is not enabled. The + and – buttons increment and decrement the set speed of the vehicle respectively when the SCC feature is enabled. The cancel button suspends the simple cruise control feature until the user reenacts the system by pressing the resume speed button. The resume speed button resumes the speed that was previously set prior to the user pressing the cancel button or the brake (both suspend the simple cruise control feature).

**Automatic Emergency Brake:** This feature contains one virtual button: enable/disable. Pressing enable activates the AEB feature that overrides all other features in the case of an emergency. Pressing the same button again after the AEB is enabled disables the automatic emergency brake feature.

**Warning System:** There are two types of warning buttons that can be pressed in the prototype that represent the type of functionality the warning system displays in particular situations. The audio warning sign would appear when a vehicle approaches too close to an object or vehicle in front of it; therefore, breaking the safe following distance threshold. “Too close” would be considered a following distance that would not allow the vehicle to stop quickly enough to avoid a collision based on the vehicle’s current speed, weight, and braking power. As the vehicle embedded with Scalable Cruise Control System approaches closer to the lead vehicle, the beeping would increase incrementally, regardless of the AEB feature being enabled or disabled. However, if the AEB feature is enabled and the system determines a crash is likely to occur based off of predetermined factory algorithms with input from the RADAR sensors and camera, the visual warning sign would go off indicating the AEB has been engaged.