Sequence Diagrams
HFDS2

Use Case 1 (Engage System)

Description (if not visible):

The Driver turns the system on. The on/off mechanism notifies the system verification. The system verification checks each environment is safe. If all of the environments are safe, notify the driver the system has been engaged, if not notify the driver the system is not engaged.

Use Case 2-3 (System Integrity Checks)
Description: The system is assumed to be engaged. The System will send a message to check the environment, the EnvironmentCheck will continuously check the conditions. If the conditions are unsafe, a warning will be displayed to the driver. The System will then check the health of the sensors. If the sensors are unhealthy, it will notify the HumanInterface to alert the driver to retake control.

Use Cases 4-5

Description: The driver turns the HFDS on. The HFDS then turns on the Driver Assist system, the Vehicle Position system, and the Vehicle Control system. The Driver Assist system
continuously checks the distance between the vehicle and any object in front of it. If it finds an object is too close given the current speed, it signals to the Vehicle Control System which in turn signals to the cruise control to slow the vehicle down. Likewise, the Vehicle Position system continuously checks if vehicle is properly within the boundaries of the lanes. If it finds the vehicle will leave the lanes, it signals a message to the Vehicle Control system, which in turn signals lane keep assist to keep the vehicle within the lanes.

Use Case 6
For the collision system, the Hands-Free Driving System must be on.

While the System is on, it should constantly be checking for objects that obstruct the vehicle. The boolean returned from checkObject() will trigger the Driver Assist System.

The Driver Assist System will constantly check if the vehicle is getting to a distance that is too close to the vehicle in front of it. If the vehicle is within 2 feet of the vehicle in front of it, the brakes will be applied. If the vehicle is at a safe distance (more than two feet away), the vehicle continues to drive.

Use Case 7 and 8

The Driver initiates the HFDS System.

The HFDS System then turns on the Driver Assist System.

The Driver Assist System constantly checks for safe Conditions and if the Conditions are not safe, it will halt the Vehicle Control System.

The Vehicle Control System will then activate the Driver Attention System.

The Driver Attention System constantly checks the Driver for inattention and head movement. If the Driver is not paying attention, it will alert the Human Interaction System.

The Human Interaction System waits for the signal from the Driver Attention System and the driver will be alerted.
Description: The Driver initiates the HFDS system. The HFDS system turns on the Driver Assist System. The Driver Assist System checks for safe conditions and if the conditions are not safe it will signal the Vehicle Control System which signals the Vehicle Control system. The Vehicle Control System will then activate the Driver Attention System. The Driver Attention System will alert the human interaction system. The Driver Attention System constantly checks the driver for his/her eye movement and head movement. It uses the information given from the checkSafeConditions(). If the safeConditions() returns False then the driver will be alerted

Use Case 9

Description: the driver will push a button to turn off the HFDS system. If the system was turned off, the warnings will stop and the driver will retake control of the vehicle. If the HFDS was turned off, all subsystems will be turned off as well

Use Case 11-13
The system administrator developed the system. If the customer allowed access to share data with the manufacturer, the vehicle will take videos, and send it to the manufacturer. After receiving the videos, the administrator can update their systems to make the other use cases more reliable and consistent.