

FLORIDA A & M UNIVERSITY
SCHOOL OF BUSINESS & INDUSTRY



Excellence with Caring

MAN 5548
Systems Theory and Design

Deliverable #3

Group Proposed Use Cases
(for submission to Engineering Group)

Date: October 25, 2015

Use Case Name: Blind spot detector	ID: UC-4	Priority: High
Actor: Systems		
Description: System will have the capability to recognize nearby vehicle location, in effort to prevent collisions via blind spots.		
Trigger: Reserve vehicle via app.		
Type: <input checked="" type="checkbox"/> External <input type="checkbox"/> Temporal		
Preconditions:		
<ol style="list-style-type: none"> 1. System must be charged and serviced appropriately 2. GPS must have a stable connection 		
Normal Course:		
<i>1.0 Request a ride to a specific destination</i>		
<ol style="list-style-type: none"> 1. User: Open door of vehicle and enters the vehicle 2. System: Asks user for destination 3. User: Communicates to the system the destination 4. System: Displays the location on the display board and confirms the location by asking user to state yes or no 5. User: Confirms location by stating yes. 6. System: Calculates the mileage and estimates the fastest time to arrive at location 7. User: Vehicle begins to drive forward 8. System: Alerted by the sensor that a stop sign is ahead 9. User: Hears a dinging sound and the system is coming to a complete stop. 10. System: Video sensors for the blind spots are activated. Turning signal is activated 11. User: Ding sound heard. Object detected on digital display board moving slowly, a bike rider 12. System: Radar sensors are activated and the radio waves determine the vehicle's surroundings. 13. User: Ding sound heard and the display board shows the part of the vehicle that is closest to the object. 		

14. System: Detects oncoming vehicle moving at a high speed, increases speed
15. User: Speedometer increases to a faster speed
16. System: Sensor detects vehicles ahead are moving slower
17. User: Speedometer decreases to a slower speed
18. System: Video sensors for the blind spots are activated. Sensors detect no other oncoming vehicles surrounding. Turning signal activated
19. User: Vehicle changes lanes and turns into destination
20. System: States that user has arrived at destination
21. User: Opens door and leaves the vehicle.

Post conditions:

1. System heads to the next destination to pick up another user
2. Drops user and the destination
3. Heads back to Ford to recharge

Use Case Name: Maintain Location of Vehicle	ID: UC-10	Priority: High
Actor: F.O.R.D System		
Description: System will make use of GPS and other mapping software, as well as other installed sensors, to collect and maintain location awareness at all times.		
Trigger: Vehicle in route to destination		
Type: <input checked="" type="checkbox"/> External <input type="checkbox"/> Temporal		
Preconditions: <ol style="list-style-type: none"> 1. Vehicle must be started 2. Vehicles GPS system must be up to date 		
Normal Course: <p>1.0 Request Vehicle Location</p> <ol style="list-style-type: none"> 1. User: Starts Vehicle 2. System: Displays current location of vehicle on display screen 3. User: Enters destination location 4. System: Scans the area looking for the best possible route to location 5. System: Selects best possible route considering traffic, accidents, etc. 6. System: Proceeds to requested destination 7. System: Remains on route selected before proceeding to destination 8. System: Retrieves information concerning location of vehicle from various resources 9. System: Continuously updates current location of vehicle as it travels to destination 		
Exceptions: <p>E1 System is unable to retrieve data concerning location due to old GPS system</p> <ol style="list-style-type: none"> 1. The system displays error message 2. The systems error message “system update required” 3. The system gives user option to update system now or later 4a. The user selects the “now” option 5a. The system automatically updates itself 6a. The system starts Normal course again 		

4b. The user selects the “later” option

5b. The system terminates the use case

E2 Best possible route is under construction and road is closed

1. The system recognizes road block
2. The system displays road block on display screen
3. The system updates current location of vehicle
4. The system scans the area looking for the best possible alternative route to location
5. The system selects best possible alternative route to destination
6. The system starts Normal case again at step 6

E3 The user changes destination while in route to previous destination selection

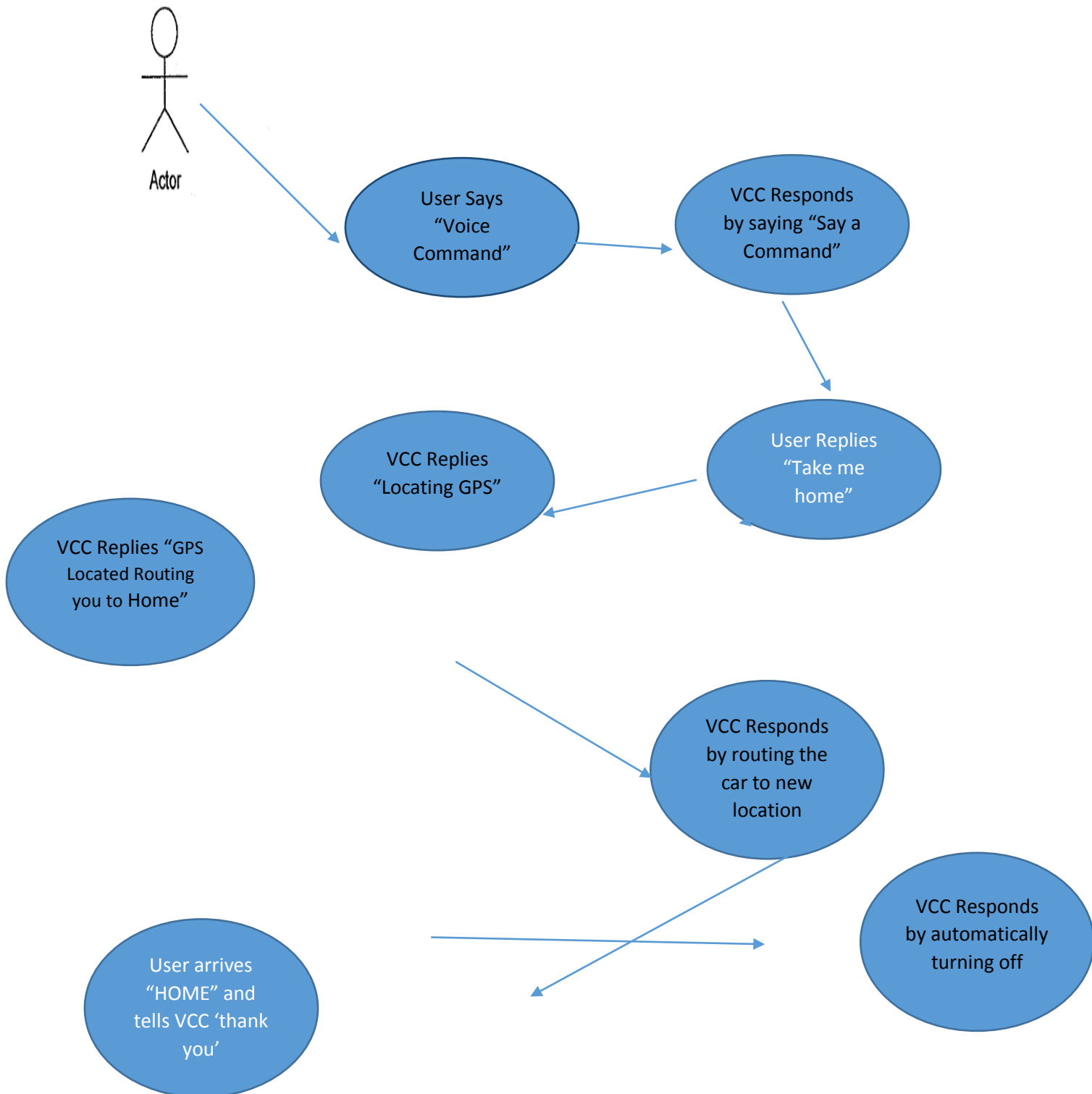
1. The user exits out of current GPS display on display screen
2. The user then changes current destination to the new destination
3. The system starts Normal case again at step 4

Post Conditions:

1. Current location of vehicle is displayed
2. Current location of vehicle is verifiable at all times

Use Case Name: VOICE COMMUNICATION WITH USER	ID: H-VC	Priority: HIGH
Actor: Voice Command Communication (VCC)		
Description: The Voice Communication System is a system that can be accessed by the users Voice. It will double as a safety feature and a convenient feature, that will allow the user to make verbal commands to the system and the system will respond verbally and the follow the given commands.		
Trigger: Anytime the User says “Voice Command” the system will automatically turn on and respond.		
Type: <input checked="" type="checkbox"/> Internal <input type="checkbox"/> External		
Preconditions: <ol style="list-style-type: none"> 1. The VCC will have to be setup by user to ensure Voice Recognition 2. The VCC will be created to be stimulated by a set group of words 		
Normal Course: <i>1.0: Voice Command System to Re-route Car to a Specific Destination “Home”</i> <ol style="list-style-type: none"> 1. User: Turn on Voice Command by saying “Voice Command” 2. System: Turns on by saying “Say A Command” 3. User: Makes a command by saying “Take me home” 4. System: Responds to command by say “You want to go home correct?” 5. User: Responds to system by saying “Yes” 6. System: Responds by saying “Locating GPS To Re-route destination” 7. User: No Response 8. System: Once new route is established system will alert Drive/User by saying “New route located, beginning route to home” 9. User: No response and continues to ride in vehicle to destination 10. System: Once Vehicle reaches destination System will alert user/driver by saying “ Arriving to destination” 11. User: Respond by saying, “Thank You” 12. System: Respond by saying “Enjoy” 13. System: Automatically turns off when Vehicle shuts down Post Conditions:		

1. Vehicle has to be turned off for system to shut down



Use Case Name: Vehicle is aware of surroundings	ID: 1.1.	Priority: High
Actor: Car Driver of F.O.R.D. Operating Device		
Description: The F.O.R.D. Operating Device Driver uses system for transportation and system autonomously transports driver through various road conditions.		
Trigger: Car Driver of F.O.R.D. Operating Device starts system; needs to arrive to destinations safely.		
Type: <input checked="" type="checkbox"/> External <input type="checkbox"/> Temporal		
Preconditions: <ol style="list-style-type: none"> 1. F.O.R.D. Operating Device is charged and serviced 2. The Car Driver of F.O.R.D. Operating Device activates system 		
Normal Conditions: <p><i>1.0 Request a ride to a specific destination</i></p> <ol style="list-style-type: none"> 1. User: Open door of vehicle and enters the vehicle 2. System: Asks user for destination 3. User: Communicates to the system the destination 4. System: Displays the location on the display board and confirms the location by asking user to state yes or no 5. User: Confirms location by stating yes. 6. System: Calculates the mileage and estimates the fastest time to arrive at location 7. User: Vehicle begins to drive forward 8. System: Uses satellite technology to Informs driver of weather conditions throughout the drive. 9. System: Asks User if weather and road conditions are up to date 		

10. User: Verifies whether conditions are the same or has changed.
11. System: Uses radar technology to sense obstruction in the road ahead of time
12. System: Uses radar technology to sense abrupt stops from other drivers on the road.
13. System: Uses radar technology to continually sense surrounding cars to prevent blind side accidents.
14. System: Uses communications technology with other F.O.R.D. Operating Devices to optimize driving conditions.

Exceptions:

E1 System is unable to retrieve data concerning location due to old GPS system

- . The system displays error message
2. The systems error message “system update required”
3. The system gives user option to update system now or later
- 4a. The user selects the “now” option
- 5a. The system automatically updates itself
- 6a. The system starts Normal course again 4b. The user selects the “later” option 5b. The system terminates the use case

E2 Best possible route is under construction and road is closed

1. The system recognizes road block
2. The system displays road block on display screen
3. The system updates current location of vehicle
4. The system scans the area looking for the best possible alternative route to location
5. The system selects best possible alternative route to destination
6. The system starts Normal case again at step 6

E3 The user changes destination while in route to previous destination selection

1. The user exits out of current GPS display on display screen
2. The user then changes current destination to the new destination
3. The system starts Normal case again at step 4

Post conditions:

1. Current location of vehicle is displayed
2. Current location of vehicle is verifiable at all times

Use Case Name: Communication between F.O.R.D. Operating Devices

ID: 1.1.

Priority: High

Actor: F.O.R.D. Operating Device

Description: F.O.R.D. Operating Device needs to effectively take commands of driver, communicate with other F.O.R.D. operating Device drivers, be aware of other cars on the road, sense obstructions in the road, and weather conditions.

Trigger: F.O.R.D. Operating Device starts system needs to transport drivers to destinations safely.

Type: External Temporal

Preconditions:

1. The Car Driver of F.O.R.D. Operating Device activates system
2. The F.O.R.D. Operating Device uses radar and satellite functions to guide vehicle through various road conditions.
3. FORD customer response service updates any information on weather and road conditions.

Normal Conditions:***1.0 Request a ride to a specific destination***

1. User: Starts Vehicle
2. System: Displays current location of vehicle on display screen
3. User: Enters destination location
4. System: Scans the area looking for the best possible route to location
5. System: Selects best possible route considering traffic, accidents, etc.

6. System: Proceeds to requested destination
6. System: Senses other F.O.R.D. Operating devices on the road
7. System: Uses radar technology to maintain safe distance between cars
8. System: Relays warnings of sudden accidents/accident avoidance to other F.O.R.D. Operating devices.
9. System: Relays warnings of traffic conditions to other F.O.R.D. Operating devices outside of sensing range.
10. System: Relays warnings of obstructions on the road to other F.O.R.D. Operating devices outside of sensing range.
11. System: Senses weather conditions and relays information to other F.O.R.D. Operating devices.
12. System: uses radar technology and communication technology to prevent blind spot collision between F.O.R.D. Operating Devices.
13. User: Types in custom message to warn other drivers of specific issues (ex. Trunk open)
14. System: Relays custom messages to other F.O.R.D. Operating device drivers.

Post conditions:

1. Current location of vehicle is displayed
2. Current location of vehicle is verifiable at all times

Use Case Name: Communication between User, cellular device, and F.O.R.D. Operating Devices	ID: 1.1.	Priority: High
Actor: Car Driver of F.O.R.D. Operating Device		
Description: F.O.R.D. Operating Device System uses wifi, and bluetooth technology to communicate with user's phone or cellular device in real-time.		
Trigger: Driver uses cellular phone to send and receive messages to F.O.R.D. Operating Device		
Type: <input checked="" type="checkbox"/> External <input type="checkbox"/> Temporal		
Preconditions: <ol style="list-style-type: none"> 1. The cellular phone has wifi/data connection 2. The F.O.R.D. Operating Device is in a functional mode to receive messages. 		
Normal Conditions: <p><i>1.0 Request a ride to a specific destination</i></p> <ol style="list-style-type: none"> 1. User: Driver says “unlock doors” 2. User: Cell phone receives message and sends to F.O.R.D. Operating System 3. System: Unlocks car doors 4. User: Driver says “Start car” 5. User: Cell phone receives message and tells system to “start car” 		

6. System: Starts car
7. User: Driver says the trip destination on the cell phone
8. User: Cell phone receives message and tells system the destination
9. System: Locates destination and begins journey
10. User: Driver types in manual message to other Operating system driver
11. User: Cell phone receives message and sends message to System.
12. System: Receives message and sends to other System.
13. System: Sends 911 Emergency message to phone
14. User: Phone receives message sends to driver
15. User: Driver receives message from phone
16. System: Sends burglary alert to phone
17. User: Phone burglary alert sends to driver
18. User: Driver receives burglary alert message
19. System: Sends maintenance/update notifications to phone
20. User: Phone receives notifications then notifies driver
21. User: Driver receives maintenance/update notifications

Post conditions:

1. Driver sends commands to Operating system via phone
2. Operating system alerts driver of notifications via phone

Use Case Name: System Communicates with other vehicles.	ID: UC - 1	Priority: High
Actor: Another System		
Description: A system that has the capability to communicate directly with other vehicles to avoid collision and save lives.		
Trigger: When systems comes into close proximity with others. System to system contact. Type: <input checked="" type="checkbox"/> External : <input type="checkbox"/> Temporal		
Preconditions: 1. The Autonomous vehicle will use the industry standard radar system that allows all vehicles to communicate directly with each other. 2. The Radar system must utilize electromagnetic plates above each wheel of the vehicle. These plates Will communicate with other vehicle plates signaling close proximity. 3. System will utilize Adaptive Cruise Control (ACC). The ACC component will use the built in sensors to Traffic to monitor traffic especially the car in-front of it. Like the traditional cruise control feature, ACC follows the flow of traffic, now with the advanced capabilities to adjust		

automatically to slower or faster speeds to avoid collision with nearby vehicles.

Normal Course:

1.0 User: Enters vehicle and commands the vehicle to drive to a specific destination.

1. System: Starts engine and greets user.
2. System: States current temperature outside and ask User what temperature would they like to set in the car.
3. User: Request temperature.
4. System: Turns on air or heat and sets to requested temperature.
5. System: Automatically pulls up data from GPS system to find current location.
6. System: Ask User to identify destination.
7. System: Displays fastest route(s) to users destination on interface.
8. System: Ask User what is the preferred route to destination.
9. User: Confirms destination route.
10. System: Reminds User the of the safety belt law.
11. User: Puts on safety belt.
12. System: Locks doors.
13. System: Radar system scans environment after confirmed destination and will continue to scan the environment every millisecond until destination is reached..
14. System: A map of all nearby objects are displayed on the touchscreen interface system so that user can see environment.
15. System: ACC system begins and the vehicle drives.
 - If vehicle is in driveway the sensors will determine if the vehicle will back out or drive forward.
 - If vehicle is in parking spot the sensors will determine if the vehicle will backout or drive. forward.
 - If the vehicle is surrounded by pedestrians the vehicle will wait until environment is clear to move.
16. System: Will use all necessary turning signals as it enters traffic and system voice over will inform User of turns, and merges prior to execution
17. System: Signals lane Change Manoeuvre for trucks with blind spots with prior notification to user.
18. System: Signals lane Change Manoeuvre for car/trucks with prior notification to User.
19. System: Signals lane Change Manoeuvre for ramp in motorways with prior

<p>notification to User.</p> <ol style="list-style-type: none"> 20. System: Announces “Approaching yellow/ red light, or stop sign” and slows down when approaching stop signs and yellow/red lights. 21. System: Scans left lane or right lane prior to changing lane. 22. System: Signals lane change and announces change to User. 23. System: Changes lane and turns off signal. 24. System: Announces that they will arrive to destination in two minutes. 25. User: Gathers belongings. 26. System: Announces approaching the confirmed address. 27. System: Parks car in front of building. 28. System: Announces Arrival. 29. System: Unlocks doors. 30. User: Removes safety belt. 31. System: Opens door. 32. User: Exits vehicle. 		
<p>Post Conditions:</p> <ol style="list-style-type: none"> 1. System: Starts vehicle. 2. System: Checks calendar for next pick up appointment. 3. System: Selects selects fastest route to next pick-up. 4. System: Sends a text message to next User of ETA. 5. System: Proceeds to destination. 		

<p>Use Case Name:</p> <p>Real-time communication</p>	<p>ID:</p> <p>UC -</p> <p>2</p>	<p>Priority:</p> <p>Medium</p>
<p>Actor: Another Information System</p>		
<p>Description: System should be able to use wifi, bluetooth, technology to communicate with user’s phone or cellular device in real-time, and allow you to receive communications from the vehicle remotely</p>		

<p>Trigger: Pressing request to connect botton</p> <p>Type: <input checked="" type="checkbox"/> External <input type="checkbox"/>Temporal</p>		
<p>Preconditions:</p> <ol style="list-style-type: none"> 1. System should be able to retrieve data from near by vehicles users cell phones through bluetooth technology 2. System will utilize wifi in order to communicate with similar (remote-far away) systems in real time 		
<p>Normal Course:</p> <p>1.0</p> <ol style="list-style-type: none"> 1.User: Starts vehicle 2. System: User interface boots and visualizes 3.User: Scrolls over and click bluetooth and system searches for nearby systems 4. System: Retrieve information of nearby systems and request to connect. 5. User: Other rejects or accepts request 6. User: When connect will be able to communicate voice call and share information. 7. User: Wifi communication request allows 2 mile connection request 8. System: Displays available local systems that the user could request to connect. 9. System: Automatically disconnects from connected users when linked user moves out of connectivity radius. 		
<p>Post Conditions:</p> <ol style="list-style-type: none"> 1.System remembers most frequent connections via Bluetooth & Wifi connectivity. 2. Alerts user when frequency connection comes within connectivity radius. 		

Use Case Name: Vehicle Prevention of Collisions Via Blindspots.	ID:	Priority: High
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	UC - 3	
Actor: Others Systems		
Description: The system will have the capability to recognize nearby vehicle location, in an effort to prevent collisions via blindspots.		
Trigger: When Vehicle Engines Start Type: <input checked="" type="checkbox"/> External <input type="checkbox"/> Temporal		
Preconditions: 1. Vehicle is fully equipped with radar system and video capabilities.		
Normal Course: 1.0 User: Enters vehicle and commands the vehicle to drive to a specific destination. 1. System: Starts engine and greets user. 2. System: States current temperature outside and ask User what temperature would they like to set in the car. 3. User: Request temperature. 4. System: Turns on air or heat and sets to requested temperature. 5. System: Automatically pulls up data from GPS system to find current location. 6. System: Ask User to identify destination. 7. System: Displays fastest route(s) to users destination on interface. 8. System: Displays all objects on interface and updates every millisecond. 9. System: Ask User what is the preferred route to destination. 10. User: Confirms destination route. 11. System: Reminds User the of the safety belt law. 12. User: Puts on safety belt. 13. System: Lock car doors. 14. System: Radar system scans environment and video sensors are turned on. 15. System: A map of all nearby objects are displayed on the touchscreen interface system so that user can see environment. 16. System: The systems blind spots additional radar plates and video		

<p>coverage are powered on after environment scan.</p> <p>17. System: ACC system begins and the vehicle is set to drive.</p> <p>18. System: Detects possible outcomes for each movement prior to changing position.</p> <p>19. System: Will use all necessary turning signals as it enters traffic and system voice over will inform User of turns, and merges prior to execution.</p> <p>20. System: Signals lane Change Manoeuvre for trucks with blind spots with prior notification to user.</p>		
<p>Post Conditions:</p> <ol style="list-style-type: none"> 1. System sends a virtual report to Ford of all blindspot captured data. 2. Ford has a file on each system 3. Ford utilizes all data to continue to improve autonomous vehicles in an effort to prevent collisions via blindspots. 		

Use Case Name: Vehicle Prevention of Collisions Via Blindspots.	ID: UC - 3	Priority: High
Actor: Others Systems		
Description: The system will have the capability to recognize nearby vehicle location, in an effort to prevent collisions via blindspots.		
Trigger: When Vehicle Engines Start		
Type: <input checked="" type="checkbox"/> External <input type="checkbox"/> Temporal		
Preconditions:		
2. Vehicle is fully equipped with radar system and video capabilities.		

<p>Normal Course:</p> <p>1.0 User: Enters vehicle and commands the vehicle to drive to a specific destination.</p> <p>16. System: Starts engine and greets user.</p> <p>17. System: States current temperature outside and ask User what temperature would they like to set in the car.</p> <p>18. User: Request temperature.</p> <p>19. System: Turns on air or heat and sets to requested temperature.</p> <p>20. System: Automatically pulls up data from GPS system to find current location.</p> <p>21. System: Ask User to identify destination.</p> <p>22. System: Displays fastest route(s) to users destination on interface.</p> <p>23. System: Displays all objects on interface and updates every millisecond.</p> <p>24. System: Ask User what is the preferred route to destination.</p> <p>25. User: Confirms destination route.</p> <p>26. System: Reminds User the of the safety belt law.</p> <p>27. User: Puts on safety belt.</p> <p>28. System: Lock car doors.</p> <p>29. System: Radar system scans environment and video sensors are turned on.</p> <p>30. System: A map of all nearby objects are displayed on the touchscreen interface system so that user can see environment.</p> <p>16. System: The systems blind spots additional radar plates and video coverage are powered on after environment scan.</p> <p>17. System: ACC system begins and the vehicle is set to drive.</p> <p>18. System: Detects possible outcomes for each movement prior to changing position.</p> <p>19. System: Will use all necessary turning signals as it enters traffic and system voice over will inform User of turns, and merges prior to execution.</p> <p>20. System: Signals lane Change Manoeuvre for trucks with blind spots with prior notification to user.</p>		
<p>Post Conditions:</p>		

4. System sends a virtual report to Ford of all blindspot captured data.		
5. Ford has a file on each system		
6. Ford utilizes all data to continue to improve autonomous vehicles in an effort to prevent collisions via blindspots.		

Name: Communicates with others vehicles

Number: UC-1

Description: HORNS application recognizes other vehicles and communicates to HORNS user proximity of others vehicles to avoid collision and save lives.

Actor: HORNS users, vehicles

Triggers: HORNS user needs to prevent vehicle from colliding with other vehicles or obstacles.

Preconditions:

1. HORNS user has Bluetooth capable device.
2. HORNS user has HORNS application installed on their device.
3. Cars, in near proximity, with HORNS application install enabled to communicate with each other.

Post conditions:

1. The HORNS user is notified of obstacles or traffic via desired communication.
2. The HORNS user adjusts or reacts accordingly to the obstacles or traffic conditions they encounter.

3. If other vehicle(s) strikes or any damage is felt from the outside of HORNS user's vehicle 911 will be called and headquarters will be notified and further steps may be taken from there.

Type: External

Normal Course:

User: Clicks vehicle communication setting in HORNS application.

System: Displays options allowing car to communicate with vehicles with HORNS application.

User: Clicks on enables.

System: Uses bluetooth to try to find other users of horns

User 2: Turns bluetooth search on from device settings.

External systems (Other HORNS Users): picks up the bluetooth signal from the initial system.

User 1: Asks to communicate to the user in the other vehicle through bluetooth.

System: Sends that message (Communication request) to external system.

External system: Picks up the message (Communication request) and displays to the user.

User 2: Accepts request.

Both users: View vehicle communication (alerts that refer to each user, i.e. car approaching, car merging) in messaging portal in HORNS Application.

Both systems: Displays list of vehicle communication between users with alerts (if applicable).

C. System should provide information to other vehicles regarding road obstructions, other traffic conditions coming up ahead.

Name: System reports road obstruction or traffic condition notifications

Number: UC-2

Description: HORNS application notifies user of potential obstacle or traffic conditions beforehand

Actor: HORNS users, vehicles

Triggers: HORNS user needs to be notified of potential obstacles or traffic conditions.

Preconditions:

1. HORNS user has Bluetooth capable device.
2. HORNS user has HORNS application installed on their device.
3. HORNS user is driving or inputs an address for desired location.
4. *The HORNS application is up to date and the latest version is running on device.
5. The HORNS user has selected desired delivery of communication (audio or visual).

*Essentially, there is only one version of the HORNS application now but in the future updates, patches or beta versions may be incorporated.

Post conditions:

1. The HORNS user is notified of obstacles or traffic via desired communication.
2. The HORNS user adjusts or reacts accordingly to the obstacles or traffic conditions they encounter.
3. The HORNS application saves route, if user prefers, for future notification or alerts.

Type: External

Normal Course:

System: Displays link on device to view road obstructions in map settings

User: Chooses desired map setting (Traditional Map or Satellite View)

System: Displays link on device to view road obstructions from current or intended location

User: Enters address of intended location or chooses current location

System: Highlights roadblocks with red marks

User: Clicks tab if they want to view roadblocks

System: Highlights construction zones with yellow marks

User: Clicks tab if they want to view construction zones

System: Highlights detours with green marks

User: Clicks tab if they want to view detour routes

*System: Displays potential traffic in designated area based off of road obstructions

User: Clicks tab if they want to view estimated time to reach a designated location

System: Displays estimated time to reach a designated location

User: Enters desired location to view optional routes

System: Displays potential hazards (i.e. weather conditions) that can affect traffic patterns

User: Clicks tab to view links to view weather conditions in weather app on phone

System: Display potential holidays, festivities or events that can affect traffic pattern

User: Click tab to view links to each event or seasonal festivity/occurrence

System: Requests user to save or end route once desired location is reached.

User: Selects if he or she wants previous route to be saved for future alerts or notifications.

System: Saves route to application

User: Clicks on history or previous locations in application when needed.

System: Sends route to Headquarters to save in case user or new HORNS selects that route.

User: Clicks on HORNS application settings to receive notifications from Headquarters.

*- Primarily, this should be predicted off of common traffic patterns (lunch break - 11am to 3pm, 5:00 traffic (5pm to 6pm), and morning traffic (7am to 9am))

D. System should be able to recognize nearby vehicle location, in effort to prevent collisions via blindspots

Name: Nearby Vehicle Detection

Number: UC-3

Description: Through vehicle sensors, vehicle is able to detect nearby vehicles and assist in preventing collisions due to blindspots.

Actor: Horns User, vehicles

Triggers: Horns User vehicle comes in close proximation to other vehicle (within 36 inches)

Preconditions:

1. HORNS user has Bluetooth capable device.
2. HORNS User has sensors already installed in their vehicle.
3. HORNS user has HORNS application installed on their device.

Post Conditions:

1. As user gets close to surrounding vehicle, Horns System will communicate with vehicle sensor that another vehicle is within 36 inches .
2. HORNS System will beep continuously as surrounding vehicle gets close to HORNS user vehicle
3. As nearby vehicle moves away beeping sound will stop

Type: External

Normal Course:

System: Displays as normal

User: Gets close to surrounding vehicle

System:

1. Gathers information from vehicle sensor that surrounding vehicle is within 36 inches
2. Notify HORNS user with a beep
3. Beep sounds continuously faster as surrounding vehicle gets closer

User: Pulls away from nearby vehicle

System: Beep sound ceases.

E. System should communicate with on-board car features (such as emergency braking, anti-skid, etc.) to alert user regarding unexpected conditions

Name: System Communication with emergency Responder

Number: UC-4

Description: HORNS application notifies 911 and other surrounding vehicles of potential danger

Actor: HORNS user

Triggers: HORNS user slams on brakes and triggers a system response.

Preconditions:

1. HORNS user has Emergency Response feature installed in vehicle .
2. HORNS user has HORNS application installed on their device.
3. The HORNS application is up to date and the latest version is running on device.

Post conditions:

1. The HORNS user is prompted to report if there is an Emergency via vehicle communication channel(Dashboard Display).
2. The HORNS user or reacts accordingly by selecting yes or no to potential Emergency.
3. The HORNS application notifies emergency response and other vehicles of potential emergency.

Type: External

Normal Course:

System: Displays warning alert once potential threat is detected

User: slams on brakes

System: confirms threat (slam on brake) and communicates with on-board car features to communicate potential threat to surrounding vehicles

User: Releases Brakes

System: Displays notification on screen asking user “Is there an emergency?”

User: Selects appropriate answer “Yes or No”

System: Warning alert display disappears If user selects “Yes”. If user selects “No” A display appears asking the user “Do you want to be connected to 911”?

User:selects yes

System:

1. Connects to 911.
2. Displays that “Help is on the way
3. Communicates to surrounding vehicles if there is an emergency in the area

H. System should be designed for voice communication with the user (audible commands from user, audio response from system

Name: Select preferred communication between system and user

Number: UC-5

Description: The user selects preferred communication requested by click voice, caption, or combined commands. The system responds to the request by converting commands into desired user preference.

Actor: HORNS user

Triggers: A HORNS user needs to hear or see commands/ alerts from their device.

Preconditions:

1. The HORNS user has basic technology skills.
2. The HORNS user has a Bluetooth enabled device.
3. The HORNS system is compatible with the Bluetooth or wireless device.

Type: External

Post conditions:

1. The desired preference is saved in the HORNS application setting.
2. The HORNS application delivers alerts or notifications via desired preference.
3. Headquarters is notified of HORNS user desired preference.
4. In case of emergency, Headquarters notifies HORNS user by audio and caption commands.
5. Headquarters, if granted by user, has the opportunity to call the USER in case of an emergency to notify user of alerts or best practices to follow in case of emergency.
6. If user unresponsive, Headquarters if granted by the user, has authority to call 911 or an emergency contact to reach Horns user.

Normal Course:

System: Displays if user wants visual, audio or combined commands

User: Selects preference of command

System: Communicates selected option based on user communication preference

User: Clicks on desired links to hear commands or response from system

System: If chose audible communication, systems will display captions at bottom of screen

User: Selected option to turn captions on or off

System: Displays tab to receive alerts from application (i.e. road obstructions, potential hazards)

User: Selects preference to turn alerts on or off

System: Displays tab to select sound preference of alerts

User: Selects options on sound preference (customized, default sounds on device)

Systems: Displays tab to selects vibration (if sound turned off) for alerts

User: Selects if they want their device to vibrate or not each time an alert occurs

I. System should relay speed and distance information from other vehicles to the operating vehicle and driver

Name: relaying the speed and relative distance to the driver and vehicle

Number: UC-6

Description: The system

Actor: HORNS user

Triggers: A HORNS system using RADAR or LIDAR to sense the other vehicles in the area and relay the information

Preconditions:

1. The HORNS user has basic technology skills.
2. The HORNS user has a Bluetooth enabled device.
3. The HORNS system is compatible with the Bluetooth or wireless device.

Type: External

Post conditions:

1. The desired preference is saved in the HORNS application setting.
2. The HORNS application delivers alerts or notifications if the driver ahead or behind him is driving erratic
3. Headquarters is notified of HORNS user desired preference.
4. In case of emergency, Headquarters notifies HORNS user by audio and caption commands.
5. Headquarters, if granted by user, has the opportunity to call the USER in case of an emergency to notify user of alerts or best practices to follow in case of emergency.

Normal Course:

System: Displays if user wants audio or combined commands of speed and distance information

Users: Selects preference

System: Communicates selected option based on user communication preference

User: Clicks on the tab that has the drivers information

System: Uses RADAR or LIDAR to communicate the speed and the distance of the driver

User: Selects how large the radius is

System: Asks user how he or she wants to be alerted of potential danger regarding a close vehicle

User: Selects their preference

System: Displays images of the car

User: Views images of car

K. System will be established for retrofitting to older vehicles via central console

Name: New system installation

Number: UC-7

Description: HORNS application will be installed via central console

Actor: HORNS user and vehicle

Triggers: wanting to communicate via HORNS

Preconditions:

1. HORNS user has Bluetooth capable device.
2. HORNS user has HORNS application installed on their device.
3. The driver in the on going Vehicle installs HORNS

Post conditions:

1. The HORNS user could now access it in the car.

Type: External

Normal Course:

User: Buys and installs HORNS and installs it in central console and turns on

System: Welcome message appears

User: activates bluetooth on phone

System: connects to bluetooth on the phone

User: clicks preferences

System: Displays preferences

User: Selected audio or visual preference, edits HORNS settings as desired.

System: Adjust to desired HORNS user preferences
