

# System Requirement Specification

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## 1 Document Properties

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## 1 Introduction

### 1.1 Purpose

The System Requirement Specification (SysRS) describes what the system’s sponsor expects the system to do, the system’s expected environment, the system’s usage profile, its performance parameters, and its expected quality and effectiveness. The SysRS is a structured collection of information that embodies the requirements of the system. The SysRS completely describes all inputs, outputs, and required relationships between inputs and outputs.

### 1.2 Scope

DrivePilot is an Auto Pilot application for automotive vehicles of all types. There will be an OEM application as well as a after-market installation kit for existing popular automobiles manufactured after 2006.

### 1.3 References

[Spice Manual](#)

## 2 General Overview

DrivePilot is the next generation of auto pilot systems for vehicles. Using complex infrared and visual imaging technology, DrivePilot allows the driver to input a destination into the DrivePilot computer, set speed and driving comforts, and sit back and enjoy the ride. DrivePilot will negotiate the driving route, look out for other automobiles, pedestrians, avoid and monitor accidents, and make course corrections to avoid traffic.

Texting while driving is no longer a problem with DrivePilot, because your not really driving anymore.

DrivePilot disengages at the touch of the conventional automotive controls, with voice command, or by interaction with the DrivePilot user interface.

DrivePilot offers automated control of gearing, speed, steering and turn signals, and braking. DrivePilot also includes interfaces into the OBDII vehicle codes and monitors certain engine vibrations to identify existing and pending maintenance problems.

## 3 Requirements

### 3.1 General Operations

drivepilot/DP-313DP-313 -DrivePilot shall easily engage operations while the vehicle is at rest.

DrivePilot shall easily engage operations while the vehicle is at rest.

|                |                          |
|----------------|--------------------------|
| Severity       | Must Have                |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

drivepilot/DP-641DP-641 -A Revised demo Requirement

A demo [Requirement 2](#)~~Requirement~~

|                |                           |
|----------------|---------------------------|
| Severity       | Will not HaveNice to Have |
| Status         | Draft                     |
| Target Version | --                        |
| Categories     |                           |

drivepilot/DP-314DP-314 -DrivePilot may not be engaged while the vehicle is under manual control. \* provi...

DrivePilot may not be engaged while the vehicle is under manual control. \* provide voice authentication \*  
provide handicap access

|          |             |
|----------|-------------|
| Severity | Should Have |
| Status   | Approved    |

|                |                          |
|----------------|--------------------------|
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

drivepilot/DP-315DP-315 -DrivePilot shall be easy to operate without extensive training.

DrivePilot shall be easy to operate without extensive training.

|                |                          |
|----------------|--------------------------|
| Severity       | Must Have                |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

drivepilot/DP-633DP-633 -The DrivePilot shall engage autonomous driving mode within 2 seconds of driver activation command while the vehicle is at rest.

The DrivePilot shall engage autonomous driving mode within 2 seconds of driver activation command while the vehicle is at rest.

|                |             |
|----------------|-------------|
| Severity       | Should Have |
| Status         | Draft       |
| Target Version | --          |
| Categories     |             |

drivepilot/DP-316DP-316 -Before any user may engage DrivePilot on public roads, that user must successful...

Before any user may engage DrivePilot on public roads, that user must successfully complete a tutorial and test DrivePilot exercise.

|                |                          |
|----------------|--------------------------|
| Severity       | Must Have                |
| Status         | Draft                    |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

drivepilot/DP-317DP-317 -Drive Pilot warnings on special conditions

DrivePilot will disengage with audible, visual notifications if the following occurs: \* Gear change apparatus is manually actuated \* Brake is manually engaged \* User shouts "Stop" \* Accelerator pedal is manually engaged \* Turn signal is activated

|          |           |
|----------|-----------|
| Severity | Must Have |
| Status   | Approved  |

|                |                          |
|----------------|--------------------------|
| Target Version | Version 2.0 (2017-10-31) |
| Categories     |                          |

drivepilot/DP-332DP-332 -DrivePilot is NOT compatible with any vehicle that has "auto parking" capability...

DrivePilot is NOT compatible with any vehicle that has "auto parking" capability.

Some models of vehicles come equipped with such capability. Not all models are so equipped, but only when not done correctly .

#### Manufacturer | Model

Toyota/Lexus | Prius, LX200

Volkswagen | Tiguan, Passat/CC,Golf

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Draft                    |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

drivepilot/DP-640DP-640 -A new Requirement for Demo

A new Requirement

|                |             |
|----------------|-------------|
| Severity       | Should Have |
| Status         | Draft       |
| Target Version | --          |
| Categories     |             |

drivepilot/DP-350DP-350 -DrivePilot shall operate with input power of 12 Volts, not to exceed 15 Amps wit...

DrivePilot shall operate with input power of 12 Volts, not to exceed 15 Amps with a +/- variance tolerance of 10%.

|                |                          |
|----------------|--------------------------|
| Severity       | Must Have                |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

## 3.2 User Console

drivepilot/DP-323DP-323 -The DrivePilot user console shall have common views in the built-in displays, an...

The DrivePilot user console shall have common views in the built-in displays, and alternative console applications.

|                |                          |
|----------------|--------------------------|
| Severity       | Must Have                |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

drivepilot/DP-324DP-324 -The DrivePilot user console will operate in the following platforms:

The DrivePilot user console will operate in the following platforms:

|                |                          |
|----------------|--------------------------|
| Severity       | Must Have                |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

drivepilot/DP-336DP-336 -Embedded, wired Native Console

Embedded, wired Native Console

|                |                          |
|----------------|--------------------------|
| Severity       | Must Have                |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

drivepilot/DP-337DP-337 -Apple iPad Application (Bluetooth)

Apple iPad Application (Bluetooth)

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 2.0 (2017-10-31) |
| Categories     |                          |

drivepilot/DP-338DP-338 -Android Application (Bluetooth)

Android Application (Bluetooth)

|          |             |
|----------|-------------|
| Severity | Should Have |
| Status   | Approved    |

|                |                          |
|----------------|--------------------------|
|                |                          |
| Target Version | Version 2.0 (2017-10-31) |
| Categories     |                          |

drivepilot/DP-352DP-352 -DrivePilot Remote Diagnostics application shall allow a computer (Linux, MAC, Wi...

DrivePilot Remote Diagnostics application shall allow a computer (Linux, MAC, Windows) to attach to the Console Controller for full system configuration, performance and history reports.

|                |                          |
|----------------|--------------------------|
| Severity       | Must Have                |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

### 3.3 Gearing Mechanism

#### 3.3.1 DrivePilot Gearing Control

drivepilot/DP-363DP-363 -DrivePilot shall interface with the onboard computer control board of the follow...

DrivePilot shall interface with the onboard computer control board of the following car manufacturers: \* Ford \* Chrysler \* General Motors \* Toyota \* Honda

|                |                          |
|----------------|--------------------------|
| Severity       | Must Have                |
| Status         | Reviewed                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Interface                |

drivepilot/DP-364DP-364 -Gearing mechanism will not apply to manual transmissions.

Gearing mechanism will not apply to manual transmissions.

|                |                          |
|----------------|--------------------------|
| Severity       | Must Have                |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Core                     |

drivepilot/DP-528DP-528 -A New Requirement

|          |             |
|----------|-------------|
| Severity | Should Have |
| Status   | Approved    |

|                |    |
|----------------|----|
| Target Version | -- |
| Categories     |    |

### 3.3.2 Gearing Options

drivepilot/DP-365DP-365 -Gearing options shall be Drive and Park only. Gearing will not support manual sh...

Gearing options shall be Drive and Park only. Gearing will not support manual shifting controls, Reverse, or Neutral.

|                |                          |
|----------------|--------------------------|
| Severity       | Must Have                |
| Status         | Approved                 |
| Target Version | Version 2.0 (2017-10-31) |
| Categories     |                          |

### 3.3.3 Drive Mode Support

drivepilot/DP-369DP-369 -Where supported by the manufacturer, DrivePilot will support the use of sport, w...

Where supported by the manufacturer, DrivePilot will support the use of sport, winter or traction control, and economy transmission modes.

|                |                          |
|----------------|--------------------------|
| Severity       | Must Have                |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

## 3.4 Throttle Mechanism

### 3.4.1 Throttle Actuator

drivepilot/DP-322DP-322 -DrivePilot controls accelerator/throttle with software-based control commands an...

DrivePilot controls accelerator/throttle with software-based control commands and a mechanical servo override to the pedal and cable assembly where applicable. Where the vehicle employs accelerator operations from the its onboard command controller, DrivePilot will interface with its APIs to controller manufacturer servo. On manufacturers that do not expose APIs, the OEM servo will be replaced with a DrivePilot servo that matches OEM specifications and provides DrivePilot capability.

|                |                          |
|----------------|--------------------------|
| Severity       | Must Have                |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Interface                |

### 3.4.2 Throttle Software Subcontroller

drivepilot/DP-397DP-397 -DrivePilot shall provide Software Throttle interface on DrivePilot Command Contr...

DrivePilot shall provide Software Throttle interface on DrivePilot Command Controller (DCC)

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Interface                |

drivepilot/DP-398DP-398 -API interface shall function with Honda vehicles.

API interface shall function with Honda vehicles.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Interface                |

drivepilot/DP-399DP-399 -API interface shall function with Toyota vehicles

API interface shall function with Toyota vehicles

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Interface                |

### 3.4.3 Throttle Accelerator Override Servo (TAOS)

drivepilot/DP-400DP-400 -DrivePilot shall provide a throttle/accelerator override servo that will control...

DrivePilot shall provide a throttle/accelerator override servo that will control the accelerator cable independently of manual mechanical operations.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Core                     |

drivepilot/DP-401DP-401 -Accelerator override servo disengages if user taps on the accelerator or engages...  
Accelerator override servo disengages if user taps on the accelerator or engages cruise control.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

drivepilot/DP-402DP-402 -Throttles must be either mechanical or electrical.  
Throttles must be either mechanical or electrical.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Core                     |

#### 3.4.3.1 Throttle OEM Accelerator Servo replacement - Honda

drivepilot/DP-405DP-405 -DrivePilot shall provide a Honda replacement throttle/accelerator servo on vehic...  
DrivePilot shall provide a Honda replacement throttle/accelerator servo on vehicles that do not have a mechanical cable.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Core                     |

drivepilot/DP-406DP-406 -Accelerator override servo disengages if user taps on the accelerator or engages...  
Accelerator override servo disengages if user taps on the accelerator or engages cruise control.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

#### 3.4.3.2 Throttle OEM Accelerator Servo replacement - Toyota

drivepilot/DP-407DP-407 -DrivePilot shall provide a Toyota throttle/accelerator override servo that will...

DrivePilot shall provide a Toyota throttle/accelerator override servo that will control the accelerator cable independently of manual mechanical operations.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Core                     |

drivepilot/DP-408DP-408 -Accelerator override servo disengages if user taps on the accelerator or engages...  
Accelerator override servo disengages if user taps on the accelerator or engages cruise control.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

### 3.5 Steering Mechanism

drivepilot/DP-410DP-410 -DrivePilot shall implement a Steering override servo (SOS) for all vehicles and...

DrivePilot shall implement a Steering override servo (SOS) for all vehicles and all applications

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

drivepilot/DP-411DP-411 -The Steering Software subcontroller shall interface with the DCC. It will provid...

The Steering Software subcontroller shall interface with the DCC. It will provide directives to the SOS.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Interface                |

drivepilot/DP-412DP-412 -The steering subcontroller will receive information from the SOS and disengage i...

The steering subcontroller will receive information from the SOS and disengage if the user grabs the wheel to override the SOS.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

drivepilot/DP-413DP-413 -The SOS will have an under-hood, and in-dash mount option. It shall mount direct...  
The SOS will have an under-hood, and in-dash mount option. It shall mount directly to the steering shaft.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

### 3.6 Braking Mechanism

drivepilot/DP-415DP-415 -DrivePilot shall implement a Braking Lever Control (BLC) for all vehicles and al...  
DrivePilot shall implement a Braking Lever Control (BLC) for all vehicles and all applications.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

drivepilot/DP-416DP-416 -Unlike mechanisms with software-based API controls available, the BLC shall be m...  
Unlike mechanisms with software-based API controls available, the BLC shall be mechanical only.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Core                     |

drivepilot/DP-417DP-417 -The Braking Software subcontroller shall interface with the DCC. It will provide...  
The Braking Software subcontroller shall interface with the DCC. It will provide directives to the BLC.

|          |             |
|----------|-------------|
| Severity | Should Have |
| Status   | Approved    |

|                |                          |
|----------------|--------------------------|
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Interface                |

drivepilot/DP-418DP-418 -The braking subcontroller will receive information from the BLC and disengage if...

The braking subcontroller will receive information from the BLC and disengage if the user presses the brake pedal manually.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

drivepilot/DP-419DP-419 -The SOS will have in-dash mount option.s

The SOS will have in-dash mount option.s

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

drivepilot/DP-420DP-420 -It shall mount directly to the brake pedal in all dash configurations.

It shall mount directly to the brake pedal in all dash configurations.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |

### 3.7 Sensors

drivepilot/DP-422DP-422 -DrivePilot will include a sensor for independent application of the throttle con...

DrivePilot will include a sensor for independent application of the throttle control from any automated or manual method.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |

|            |      |
|------------|------|
| Categories | Core |
|------------|------|

drivepilot/DP-423DP-423 -DrivePilot shall include a sensor for independent application of braking control...

DrivePilot shall include a sensor for independent application of braking control from any automated or manual method.

|                |             |
|----------------|-------------|
| Severity       | Should Have |
| Status         | Approved    |
| Target Version | --          |
| Categories     | Core        |

drivepilot/DP-424DP-424 -DrivePilot shall include a sensor for independent application of braking control...

DrivePilot shall include a sensor for independent application of braking control from any automated or manual method.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Core                     |

drivepilot/DP-425DP-425 -DrivePilot shall include forward, side, and rear infrared imaging sensors to det...

DrivePilot shall include forward, side, and rear infrared imaging sensors to detect biological obstacles (deer, dogs, humans) and other potential obstacles (other vehicles, buildings).

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Core                     |

drivepilot/DP-426DP-426 -DrivePilot shall include forward, side, and rear radar sensors for the detection...

DrivePilot shall include forward, side, and rear radar sensors for the detection of potential obstacles and traffic congestion.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Core                     |

drivepilot/DP-427DP-427 -DrivePilot will include a road condition sensor to detect friction coefficients...

DrivePilot will include a road condition sensor to detect friction coefficients of current road surface.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Core                     |

drivepilot/DP-428DP-428 -ABS Interface Sensor shall interface with existing ABS system to detect braking...

ABS Interface Sensor shall interface with existing ABS system to detect braking slippage and relay data to BSS.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 2.0 (2017-10-31) |
| Categories     | Interface                |

drivepilot/DP-429DP-429 -DrivePilot shall contain sensors to monitor unusual vibrations from: \* chassis \* ...

DrivePilot shall contain sensors to monitor unusual vibrations from: \* chassis \* engine \* transmission \* axle / wheels

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     | Core                     |

## 4 Nonfunctional Requirements

### 4.1 Performance Requirements

drivepilot/DP-432DP-432 -DrivePilot cannot cost more than US \$25,000 to install into any new or existing,...

DrivePilot cannot cost more than US \$25,000 to install into any new or existing, compatible vehicle.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Reviewed                 |
| Target Version | Version 1.0 (2017-07-31) |

|            |  |
|------------|--|
| Categories |  |
|------------|--|

drivepilot/DP-433DP-433 -DrivePilot cannot require more than 1 annual update to software or firmware.  
DrivePilot cannot require more than 1 annual update to software or firmware.

|                |                          |
|----------------|--------------------------|
| Severity       | Should Have              |
| Status         | Approved                 |
| Target Version | Version 1.0 (2017-07-31) |
| Categories     |                          |