



EV Trip Planner

Product Requirements Document <DRAFT>

Electric Vehicle Connected Services

Feature Bundle 5 (FB5)

Version 1.0

05Sep18

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1 Change Control

Table 1-a Revision History

Revision	Author	Description	Sections Affected	Release Date
1.0	S. Steele	Initial Draft	All	

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2 Introduction

Driving an Electric Vehicle has some drawbacks. One of the most obvious is the state of charge of the battery and if that charge status would allow the customer to make it to their final destination. EV Trip Planner will help alleviate that concern by providing a driver with a route to their destination and plotting charging opportunities throughout the journey. This experience must allow the user to alter the route for any reason up to and including alternative routing if the customer inadvertently changes route or the DTE calculation changes due to circumstances like weather, terrain and traffic. The feature will utilize the HMI, FordPass App, FordPass web portal, Navigation Cloud and the VSDN Cloud and would need to integrate each of them.

3 Current State

You can set the optimal route for your journey with the SYNC 3 Navigation system by pressing the Destination icon to set a destination. This option lets you enter a specific address or use a variety of search methods to get where you want to go. Tap anywhere on the touchscreen map to activate Map mode, which lets you interact with the map's interface to navigate to a destination.

You can also use voice commands to set a destination or find a point of interest (POI). To access this feature, press the Voice Command button on your steering wheel and tell SYNC where you want to go. Then follow the instructions SYNC gives you by viewing the touchscreen map or a detailed turn-by-turn set of directions.

4 Opportunity

EV competition offers advanced digital and connected vehicle features. In order to compete develop competitive BEV connected vehicle features that deliver "Don't Make Me Think" EV charging experience. The intelligent routing algorithms takes into consideration the optimal times to charge while reducing the number of stops for a trip that requires less stops. The algorithm does this by utilizing all the data that is most important to an EV trip including charging rates, amount of power spent, and road incidentals like speed, elevation and traffic statuses. Trip planner also stores and learns from your previous trips that saves you time and provide for a better and worry free distance driving experience.

5 Goal

The goal is to develop a competitive BEV experience that features the ability to utilize the Cloud DTE (Distance to Empty EV) to highlight a route for customers with waypoints or destinations for charging based upon DTE. This will greatly improve the driver's



experience utilizing the driver's driving habits and other variables in determining trip options.

6 Scope

The Scope of this document is to document and describe how the vehicle interfaces with the cloud and all data transmitted between vehicle <-> cloud while identifying an overview of the EV Trip Planner experience for both the customer and interfaces.

7 Objectives

Providing customers with a tool that utilizes data in a smarter, strategic way to provide a better driving experience to customers. This experience will utilize route calculations including DTE by identifying whether charging is needed to reach a destination.. Provide accurate details for a planned trip.

- Reduce Anxiety by effortlessly planning the charging experience during longer trips
- Incorporate points of interest during trips that add unique value to charging wait times
- Automatically suggests trip options no matter how many inputs the user provides
- Leverage crowd-sourced data and feedback to react to real-world experiences

8 Assumptions

No.	Description
A1	To utilize the EV Trip Planner feature, the user has a FordPass/LincolnWay account
A2	EV Customers will use FordPass and LincolnWay for their connected experience
A3	Driver must complete authorization on the vehicle to access EV Trip Planner. This means the user has met the following conditions: <ul style="list-style-type: none">• User has installed and created a valid login account for the Ford owner mobile app• User has registered an eligible vehicle VIN (define as a VIN which is known to have a TCU installed and has sent a provisioning message to NGSDN) User has completed the authorization process for the eligible VIN
A4	Designs and concepts of UI/UX shown in PRD are not finalized content.



No.	Description
	UI/UX team to define the right experience
A5	The FordPass team will determine how the experience will differ on the web and the mobile app. For the purpose of this document, any reference to "FordPass" could mean via any of the defined FordPass channels
A6	The user experience for this feature will be consistent across FordPass, HMI and web
A7	Payment & Subscriptions are not required for the EV Trip Planner feature
A8	EV Trip Planner will be available per-VIN and not per-user

9 Dependencies

No.	Description
D1	Cloud DTE - Distance to Empty is needed for calculations (EV Trip Planner will launch without CE - DTE and added later via OTA)
D2	Infotainment integration needed for legal/safety compliance - Hands-Free
D3	EV Trip Planner will utilize Sync 4 Analytics (will it store this in the cloud?)
D4	Level 3 and Level 2 Chargers are required at each route designated waypoint
D5	Mobile app availability (for download) will depend on mobile application store (Apple Store and Google Play).

10 Constraints

No.	Description
C1	Feature availability is limited for access to registered owners/users in supported regions (North America, Europe, China)
C2	Feature experience is dependent on the chosen utility aggregator for each region
C3	Limitations by vehicle & modem connectivity

11 Actors

Actor	Vehicle/Cloud	Team Responsible	Description
TCU	Vehicle	TCU	The Service Delivery Network processes the data provided by the TCU/ECG and converts it into the appropriate format for delivery to a given User Interface or 3rd Party



Actor	Vehicle/Cloud	Team Responsible	Description
			Provider.
Nav Cloud	Cloud	Nav	3 rd Party Provider
TMC/VSDN	Cloud	TMC/VSDN	Transportation Mobility Cloud replaces the SDN and is a combination of services from Autonomic coupled with Ford IT services to offer device connectivity and transformative functions for Fleet, Retail and Analytic applications
VPOI	Cloud	EPE	Vehicle Point of Interest – Similar to HPCM but in the cloud; syncs with HPCM when user makes changes via FP/LW
BCCM	Vehicle	EPE	The Battery Charge Control Module is the High Voltage charge controller on BEVs and PHEVs.
HPCM	Vehicle	EPE	Hybrid Powertrain Control Module – in-vehicle module that holds Departure Times and Charge Settings
SYNC/APIM	Vehicle	Sync Team	Centerstack user interface inside the vehicle
CMS	Cloud	?	Charge Management System and Integration Layer
Ford System TBD	Cloud	?	TBD

12 Stakeholder list

Team/Module	Key Contact
HPCM	Chuck Badger, Angel Porras, David Treharne
EPE (BCCM & BECM module)	Navid al-Rahbari, Scott Turik, Jeff Grimes
Team Edison – EV Trip Planner Product owner	Nick Yap
Cloud - SDN	Yona Shaposhnik, Sneha Palande



IT Implementation

?

CVVP – EV Trip Planner Product Manager

Sonya Steele

SYNC HMI/APIM

Preethi Kumar, Mohammad Kalash

13 High Level Overview

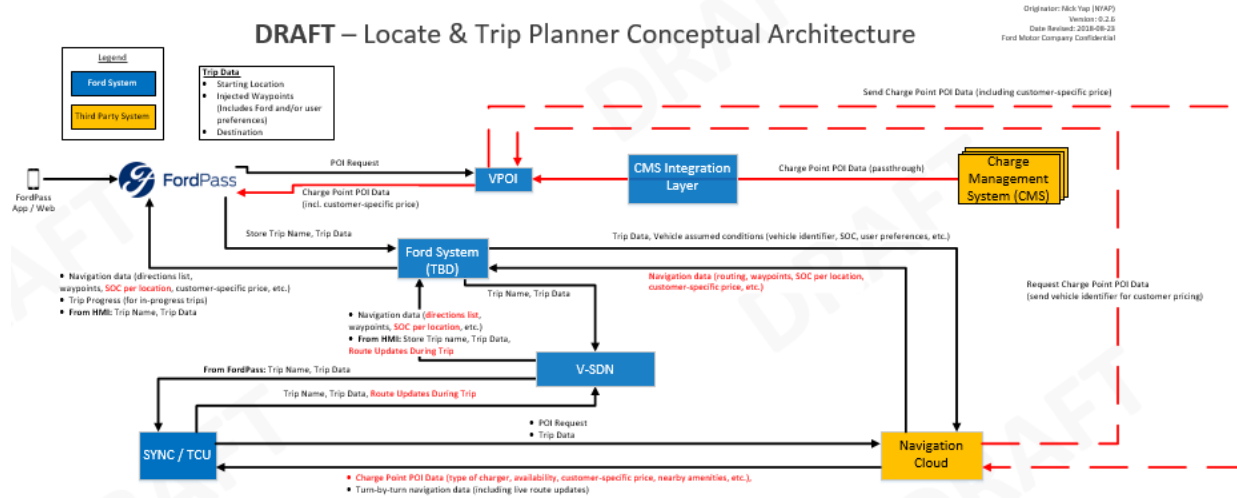


Figure: 1 EV Trip Planner High-level Overview

14 Trip Display – Waypoints/POI Destinations (Example)

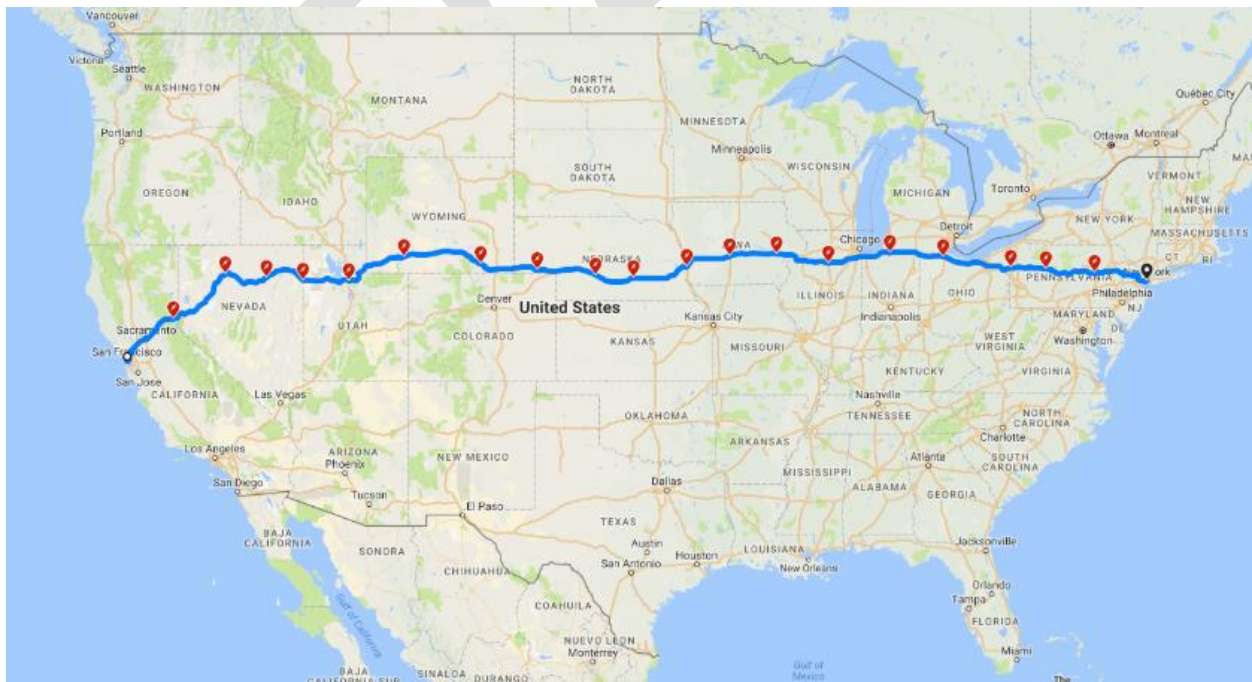
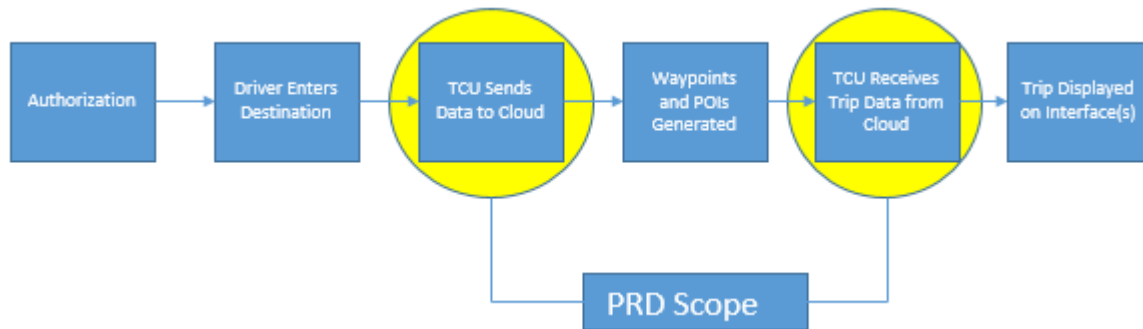


Figure 3: Waypoints/POI Destinations (Example)



The feature helps you plan your route to your destination using waypoints that will be highlighted/mapped along the route. The route consists of a map utilizing your start and end locations cataloging the waypoints within the journey.

15 High Level Journey



16 High Level Requirements

Requirement	Description
EV Trip Planner must accurately predict the energy required to reach each waypoint	The basis of the feature is perform calculations while relaying this information to the customer in real time to plan their charging strategy
Automatically Navigate To Convenient Charging Locations along the Route and Provide the Ability to Reserve Station	The plan will show waypoints on the route from the initial location to the final destination
Plan trips in advance via FordPass app, Web, Vehicle HMI	The user has the ability to create a Trip Plan by way of the FordPass App, the FordPass Web Portal or the vehicles HMI
Provide Recommendations When Stopped	The DTE will determine if charging is necessary and either recommend charge or the driver can continue to next waypoint without charging
Navigating With Adjustments	The customer needs the ability to deviate from a plan at any time so the calculations will need to be agile and accommodating
Recall a Previous Plan	Plans must be stored to for the user to be able to recall a previous plan and recalculate a trip via that plan
Provide Trip Summary at End of	The end of trip summary provides the customer trip



Requirement	Description
Trip	defining information
Review Trip	The ability to review the trip via HMI, App and Web
Delivering Route	Route can be sent via multiple avenues: FP App, In vehicle HMI Nav, FP Web site
ETA	Show ETA to each charge point location or destination/waypoint
SOC	Show battery SOC at destination and Battery SOC at destination must be sufficient to reach a charger location
Welcome Screen	Show welcome screen during route guidance when the vehicle reaches charge location

17 Charging Definition

Level 1 Charging	Level 2 charging refers to the voltage that the electric vehicle charger uses (240 volts). Level 2 chargers come in a variety of amperages typically ranging from 16 amps to 40 amps. The two most common Level 2 chargers are 16 and 30 amps, which also referred to as 3.3 kW and 7.2 kW respectively.
Level 2 Charging	Level 3 equipment with CHAdeMO technology, also commonly known as DC fast charging , charges through a 480V, direct current (DC) plug. Most Level 3 chargers provide an 80% charge in 30 minutes.

18 Glossary

Acronym	Description/Definition
SOC	State of Charge
EV	Electric Vehicle
POI	Point of Interest
PHEV	Plug-in Hybrid Electric Vehicle
FP	Ford Pass
GPS	Global Positioning System
HMI	Human-Machine Interface
NFC	Near-Field Communications

19 References



[This section should provide a link to all relevant documentation. Current state process models, Future State process models, existing ecosystem design artifacts, relevant guidelines, standards, policies, etc.,]

20 Document Approval

PERSON	ROLE	EMAIL CONFIRMATION	Date

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