



September 2023  
In-Car HMI UX Evaluation & Benchmarking  
Fisker Ocean

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In-car HMI UX Evaluations

#635

# In-Car HMI UX Evaluation & Benchmarking

## Fisker Ocean

In this edition, the UX team is testing the Fisker Ocean.

The Fisker Ocean returns a disappointing user experience score, finishing lowest among all vehicles tested in 2023 so far and only achieves a B- for functionality, finishing equal to the second lowest vehicle tested in 2023. This scoring is based on the current offering at the time of testing (August 2023).

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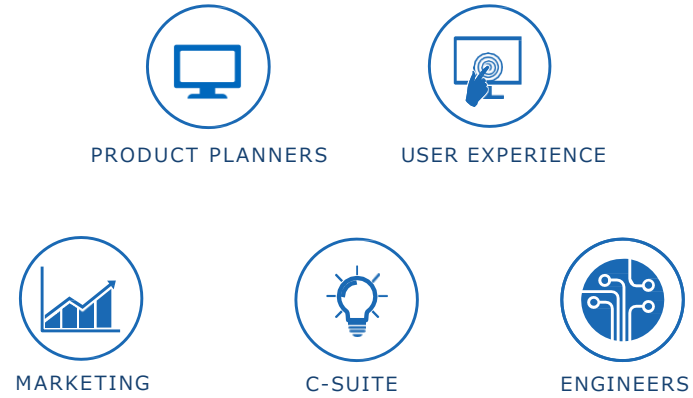
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# Scoring

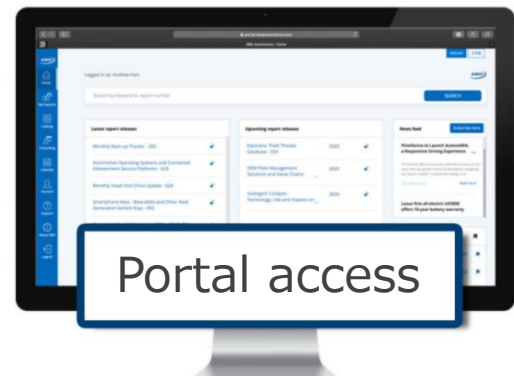
- > **Features and functionality:** evaluating whether the solutions provide features that customers expect, need and solve problems (or provide a wow factor).
- > **Reliability/stability:** evaluating the repeated usability and whether the users can have a similar (positive) experience each time.
- > **Usability:** evaluating whether the features available are easy to learn and use. This considers areas such as ergonomics, legibility, usability characteristics and how the system implements the various features.
- > **Perceived quality:** evaluating the potential perception in quality of the HMI components and how this contributes to the overall customer experience.

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## September 2023 In-Car HMI UX Evaluation & Benchmarking Fisker Ocean

## 635 - In-Car HMI UX Evaluation & Benchmarking – Fisker Ocean

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## Introduction

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# Aim of this report

Welcome to the 2023 HMI benchmarking report series. This report has been created to provide a fair, unbiased and objective view of the latest in-vehicle HMI solutions in the US, European, and Japanese markets. Evaluations are carried out by SBD usability experts with a deep understanding of CASE domains such as the Connected Car and ADAS & autonomy domains.

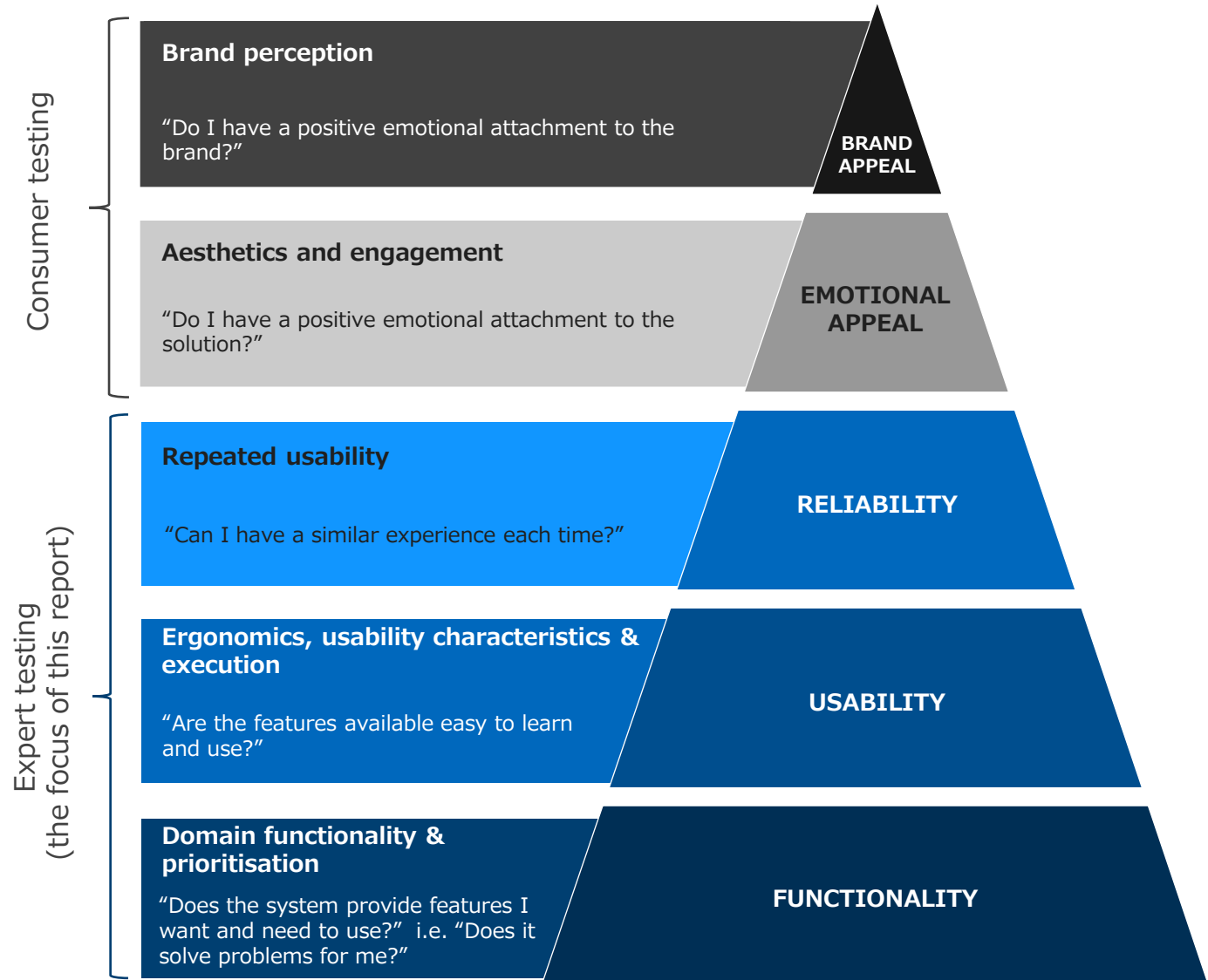
One of the core goals of these studies is to provide a true indication of what the final customer experience of each solution could be. To do this evaluations are focused on providing scoring and analysis in the following areas:

- **Features and functionality:** evaluating whether the solutions provide features that customers expect & need, and solve problems (or provide a wow factor)
- **Usability:** evaluating whether the features available are easy to learn and use. This considers areas such as ergonomics, legibility, usability characteristics and how the system implements the various features
- **Reliability/stability:** evaluating the repeated usability and whether the users can have a similar (positive) experience each time
- **Perceived quality:** evaluating the potential perception in quality of the HMI components and how this contributes to the overall customer experience

SBD supports clients throughout the development of new HMI and products from a relatively simple companion app to a more complex multi-domain infotainment solution. The methodologies used in these reports take into account many years of experience with consumer testing and custom client projects to provide a fair and, as much as possible, objective methodology.

All viewpoints and analysis within the report are aimed defining areas of concern through a data driven approach. This report aims to benchmark and score solutions whilst also being able to provide actionable recommendations to design and development teams.

Please note that due to the ever-evolving automotive technology market, SBD updates it's methodology each year, but does not update scores from the previous years. Therefore, please assume a slight drop in scores for both user experience (UX) and functionality from the previous year.



SBD's view on the hierarchy of needs for CX benchmarking



# Scope of report: focus on in-car HMI evaluations

The scope of evaluations in this report are constrained to the in-car HMI experience, in both static and dynamic conditions. One notable element is driver distraction which SBD covers at only a high level in this study as carrying out a full driver distraction evaluation requires biometrics test equipment to ensure the collected data is unbiased and objective.



A full evaluation of the end-to-end customer experience is not within scope of this report, but it is something which SBD has many years experience in from both a consumer and expert perspective. Other areas such as the companion app, online portal and in-home smart devices are not in scope as they are defined as “out of car” experiences.

Within the vehicle, any HMI element the user interacts with is evaluated including steering wheel controls, touch screen displays, voice control, HUDs and digital keys. The features and services on offer have been broadly grouped into the following domains (or test areas):

- ADAS domain
- Infotainment domain
- Navigation domain
- Voice recognition domain
- Connected services domain
- Convenience domain













# 2023 vehicle list

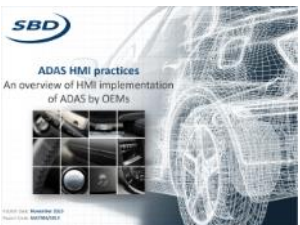
SBD has chosen six cars to evaluate in 2023, based on two selection categories. New/interesting UX focuses on systems with to never-seen-before features or functionality, or the implementation of a solution that has previously been a challenge or pain-point for end-users. New mass-market UX includes vehicles in segments that are sold in high numbers and are entering a new generation of UI for that vehicle. While we make best efforts to adhere to the chosen cars and schedule, the last two years have seen release dates slipping significantly, so it may be necessary to make substitutions.

Cars tested					Planned cars for 2023
					
<b>Jeep Grand Wagoneer</b>	<b>Nissan Ariya</b>	<b>BYD Seal</b>	<b>Peugeot 408</b>	<b>Fisker Ocean</b>	<b>MG4</b>
<ul style="list-style-type: none"> <li>▪ Passenger display</li> <li>▪ Amazon Fire TV</li> <li>▪ Active Drive Assist</li> <li>▪ US market test</li> </ul>	<ul style="list-style-type: none"> <li>▪ ProPilot Assist</li> <li>▪ Unique HMI and interior</li> <li>▪ EV SUV</li> <li>▪ German Market Test</li> </ul>	<ul style="list-style-type: none"> <li>▪ Unique Home Screen HMI</li> <li>▪ EV</li> <li>▪ Chinese market test</li> </ul>	<ul style="list-style-type: none"> <li>▪ Drive Assist 2.0</li> <li>▪ 3D instrument cluster</li> <li>▪ German market test</li> </ul>	<ul style="list-style-type: none"> <li>▪ EV SUV</li> <li>▪ Sustainable materials</li> <li>▪ Large central display</li> <li>▪ German market test</li> </ul>	<ul style="list-style-type: none"> <li>▪ Chinese-owned brand sold in EU market</li> <li>▪ MG Pilot ADAS</li> <li>▪ Live services</li> <li>▪ EU market test</li> </ul>



# SBD experience through years of testing in-car solutions

Over the last ten years SBD has evaluated over 100 solutions from a Connected Car or ADAS perspective for our public report series (many more for private client evaluations). This current report series is an evolution of both test methodologies to provide a holistic view of in-car HMI. Furthermore, custom evaluations methodologies used across the globe for SBD clients have been included where applicable to enhance to overall approach.





# One page methodology overview

One of SBD's core goals of this report is to be as objective, fair and as transparent as possible. To achieve this, various methodologies are used throughout the testing to evaluate different areas of the solution in various conditions.

These methodologies are a mix of different types of tests:

- **Objective tests:** where the value provided is not influenced by a tester's viewpoint e.g. response time
- **Subjective tests:** the test score is based on the expert testers' viewpoints e.g. task ease of use
- **Task-based:** evaluations carried out based on a predefined task list e.g. navigate to a pizza restaurant near location X
- **Freeform:** random free testing by the tester with no clear pre-defined task list. This allows the testers flexibility to dig deeper into various parts of a solution when needed
- **Scoring range:** ranges and definitions of how to score a test element e.g. poor depth and accuracy score = the results provided are not in line with what is reasonably expected by the user
- **Static:** tests are carried out when the vehicle is not moving
- **Dynamic:** tests are carried out when the vehicle is moving in various road conditions and locations e.g. motorways/highways, cities, villages, country roads etc.
- **Misuse/failures:** carried out to evaluate the stability of the solution in unusual conditions e.g. repeatedly pressing the voice command button

This document does not provide a detailed description of the methodology and this page serves to provide an overview of the approach.

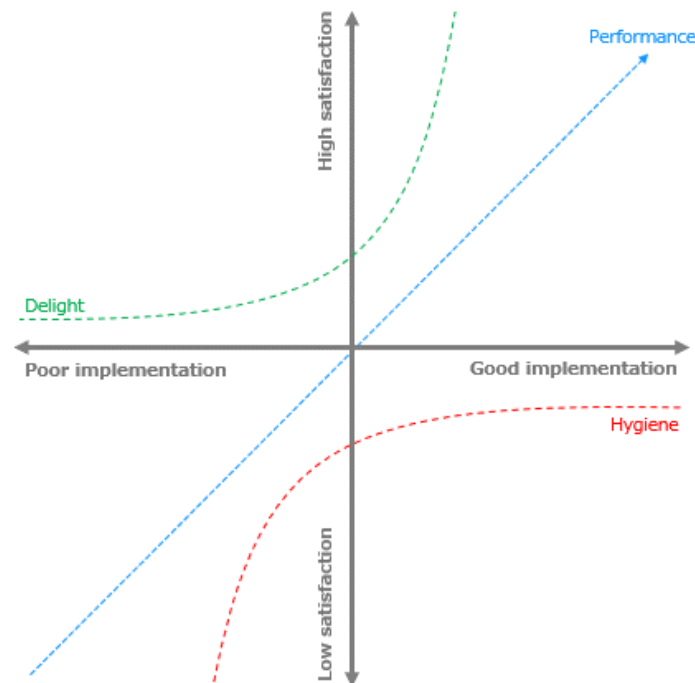
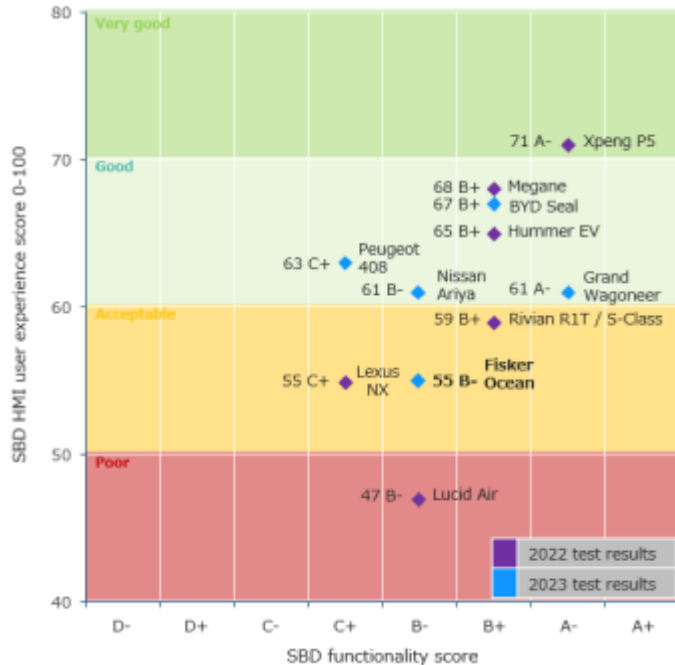
For a detailed discussion and presentation of SBD's methodology please [contact us](#).

Test area	Type of tests							
	Objective	Subjective	Task based	Freeform	Scoring range	Static	Dynamic	Misuse/failures
First impressions		✓		✓		✓	✓	
Static tasks	✓	✓	✓		✓	✓		
Dynamic tasks	✓	✓	✓		✓		✓	
Random free	✓	✓		✓		✓	✓	✓
Navigation specific tests	✓	✓	✓		✓		✓	✓
Voice recognition	✓	✓	✓	✓	✓	✓	✓	✓
Performance & response	✓		✓			✓	✓	✓
System Usability Scale (SUS)		✓			✓			
Final SBD UX score	✓	✓			✓			
ADAS	✓	✓	✓		✓	✓	✓	✓
UX heuristics	✓		✓			✓	✓	
Execution		✓			✓			
Ergonomics	✓	✓	✓			✓	✓	
Legibility & readability	✓		✓			✓	✓	
Perceived Quality (PQ)	✓	✓	✓	✓	✓	✓	✓	

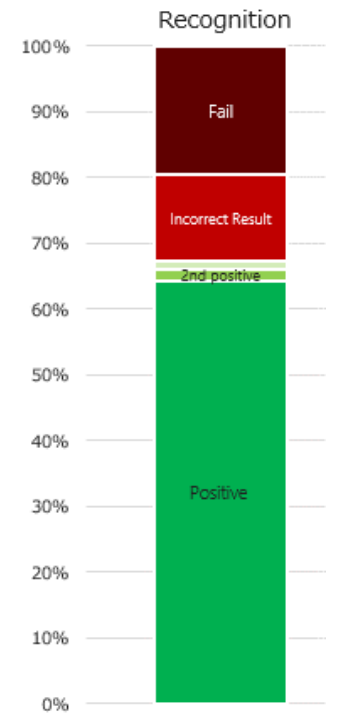


# Report structure and how to interpret certain data sets

Throughout the testing and evaluation process SBD uses multiple methodologies to align to the situation and test area. Outputs from these evaluations can be broadly grouped into the following three types of report outputs - SBD's goal with these options is to ensure understanding of the results are as clear and fair as possible.



UX heuristic	Score
Cockpit clutter	Good
GUI clutter	OK
Display quality/size	Good
Map aesthetics	Very good
Map layout	OK
Navigation routing	OK
Instrument cluster	Good
General system HMI	OK



## UX & functionality score

Final usability scored based on a 100-point scale with solutions scoring less than 40 defined as "not fit for purpose" with major user complaints expected and score above 80 defined as "exceptional".

Functionality score based on eight core feature set areas: delight features, performance features, hygiene features, navigation feature, ADAS, IoT integration, music, entertainment and info features.

## Modified Kano feature analysis

Features plotted against three lines based on their implementation and satisfaction levels:

- **Delight** features: "wow" features likely to provide high satisfaction even with poor implementation
- **Performance** features: as the level of implementation increases so does the customer satisfaction
- **Hygiene** features: poor implementation provides low satisfaction, but good implementation may not provide positive satisfaction as it can be considered as expected functionality

## Subjective & objective scores

Scoring across multiple areas through subjective scoring with pre-defined ranges, definitions, and comparison to past results.

Objective scoring generally based on a pass/fail criteria or time-based considerations. SBD attempts to minimize subjectivity as much as possible with results aimed at being fair and reasonable with a minimal level of bias.



# Example slides from the report

This is an example slide from the report, enclosed in a white border. The top portion of the slide features a photograph of a car's interior, specifically the dashboard and steering wheel area. A large, vertical infotainment screen is the central focus, displaying a user interface with various icons and text. Below the photograph, there is a blue banner containing the SBD logo on the left and the text 'September 2023 In-Car HMI UX Evaluation &amp; Benchmarking Fisker Ocean' on the right. At the bottom of the slide, there is a prominent blue button with the white text 'Request price' and a white chevron symbol pointing to the right.



# Impressive delight features, lack of flexibility and filtering

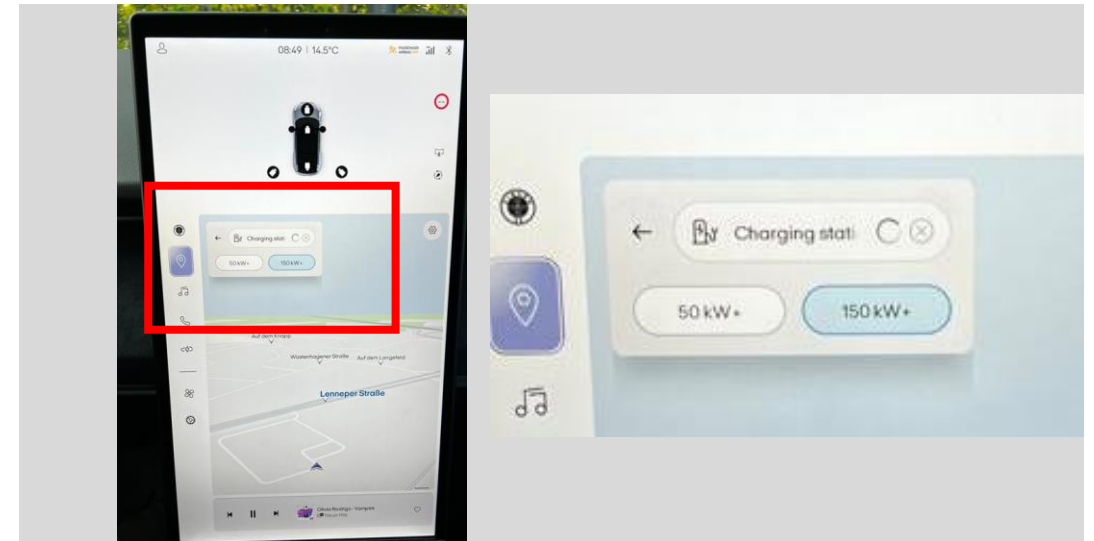
- The Fisker is likely to provide high levels of satisfaction via its numerous delight features integrated into the vehicle.
- Major delight features include Hollywood Mode, California Mode, Boost Mode and solar panel roof.
- Other minor delight features that are till likely to impress many users include under seat storage, rear LCD HVAC controls and fold out/pull out trays for both driver and passenger.



**Hollywood Mode**

By pressing and holding the center button on the HVAC bar below the central display, the screen rotates to landscape orientation which is referred to as Hollywood Mode. This gives access to all entertainment apps and allows users to stream movies and watch videos while the vehicle is stationary. This mode is not possible when the vehicle is in motion. As soon as another gear other than Park is selected, the screen rotates back to portrait orientation.

- Slow route calculation times and lag when interacting with the map affect the overall impression of the system.
- Filtering of charge point location and searching for POI in specific locations other than the current location is not optimized and is likely to become frustrating.
- The lack of ability to customize menus and button layouts prevents the system from being truly flexible and allowing the user to tailor the HMI to their needs.



**Lack of filtering ability for charge points**

The only obvious parameters for filtering charge points when searching using the navigation system is by charge speed. Only two speeds are able to be selected as filters. User can filter by brand but this must be typed out in full using the search bar. This limited filtering is likely to become frustrating for many users and may result in users switching to external devices to find the desired chargers.



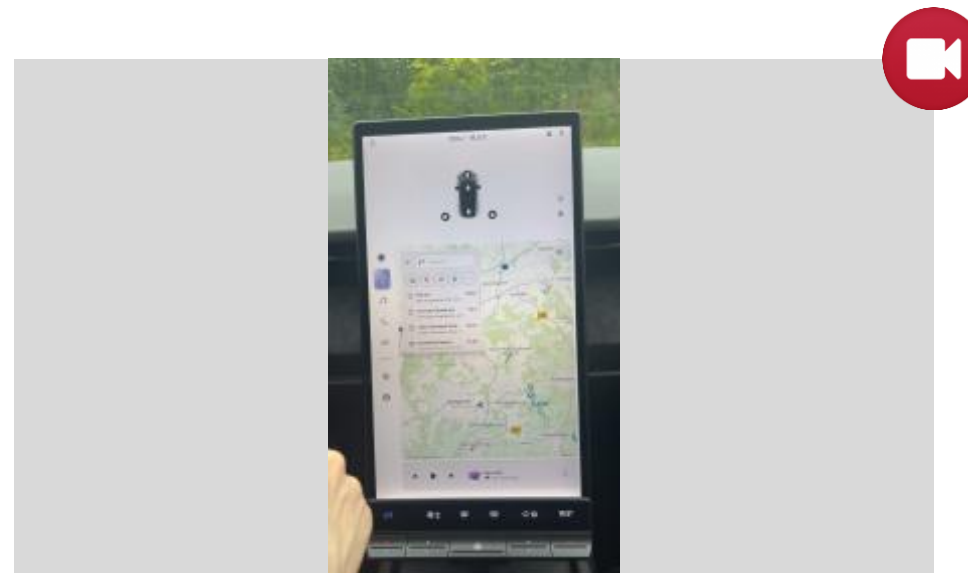


# Unresponsive navigation interface

## 6. Navigation

On one occasion, the entire navigation interface including controls and buttons become unresponsive. Other buttons around the navigation window responded correctly to user input. A soft software reset was required.

Frequency	Low	Medium	High
Severity	Minor	Major	Critical



# Key highlight



Large steering wheel buttons

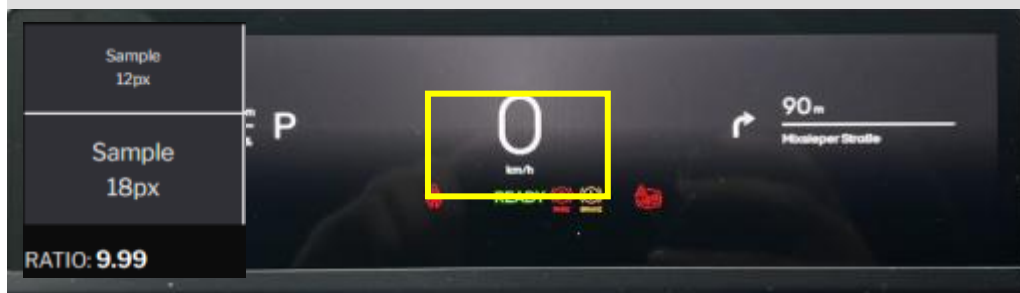
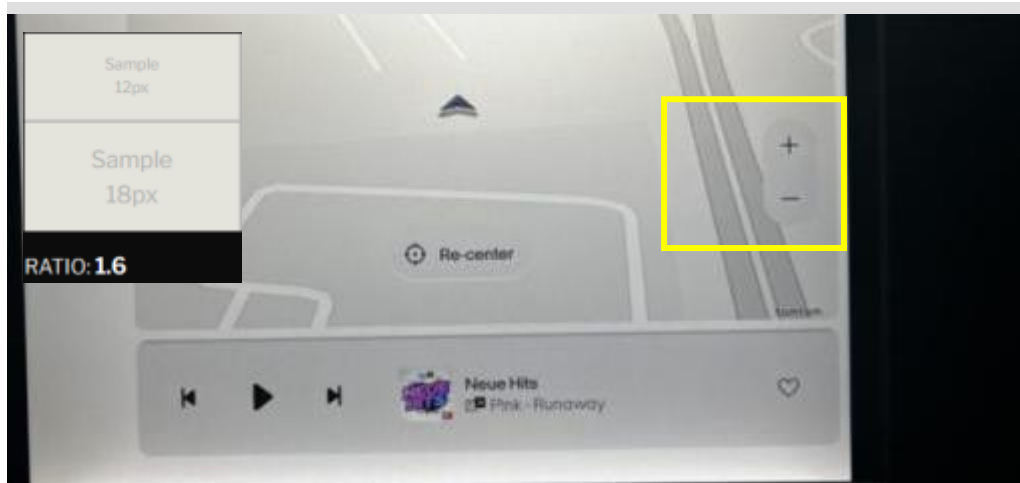
## Steering wheel buttons easy to operate

### The buttons on the steering wheel are large and prevent misoperation

The buttons located on the steering wheel panels are very large and obvious and can be operated easily. This reduces chances of misoperation and allows for operation while driving without the need to take eyes off the road.

Additionally, many users will be able to operate these buttons while still keep their elbow on the center arm rest and door armrest.

# Legibility: Contrast



Contrast concerns in central display

## Contrast is an issue in central display

### Navigation zoom and re-center buttons present poor contrast

The navigation zoom buttons and re-center button in the central display are colored in a light gray against a very similar light gray map coloring. This results in the button blending into the background and the black text becoming confused with map labelling. This contrast scored “Significant risk” with 1.60:1. As these buttons are likely to be used while driving, it scores an “Unacceptable” acceptability rating.

The instrument cluster poses no risk with good contrast due to light colored text on a dominantly dark background. The instrument cluster scores “Low/no risk”.

Display	Worst text contrast ratio	Final Rating
Central display	1.60:1	Significant risk
Instrument cluster	9.99:1	Low/no risk

Display	Severity / Driver distraction Rating	Acceptability Rating
Central display	Significant risk	Unacceptable
Instrument cluster	Low/no risk	Acceptable



# Perceived Quality: Tactile

Level 1	<b>Tactile</b>
SBD viewpoint	<p><b>Stiffness &amp; looseness:</b> The screen can wobble when slight pressure is applied. It does not feel secure. Trim bar across the dashboard feels loose and bends under slight pulling and pushing. Door handles have a flimsy tactile quality. Steering wheel buttons have wobble to the entire panel. The center arm rest has a large amount of unintended movement and lower center console plastic components move around more than expected.</p> <p><b>Force feedback:</b> Steering wheel buttons feel soft and well damped. HVAC button bar has a harsh clicking feel with no damping. Steering wheel scroll wheels have massive indents which add a perception of quality.</p>
	<p><b>Material quality:</b> The door handle has the lowest tactile quality. It gives the impression of being hollow. Lower center console has an inconsistent material quality to everything else. Upper dash and suede material give premium touch and appearance. The HVAC buttons can be pulled upwards and to increase values. (clearly not intended)</p>
	<p><b>Material harmony:</b> Material quality varies throughout cabin with no real logic. Four different materials come into close visual contact and can create a messy appearance.</p>
	<p><b>Geometric &amp; Positioning:</b> The geometric and chunky appearance and tactile quality of buttons, especially around the steering wheel match the rugged yet minimal aesthetic of the vehicle.</p>



Level 2 scoring				
Stiffness & looseness	Force feedback	Material quality	Material harmony	Geometric & positioning
Fair	Fair	Fair	Fair	Good

# Good level of warning, lack of differentiation for LKA/LDW

Category System	LKA/LDW	System Usage BSM	RCTA
SBD viewpoint	<p>LKA/LDW warnings are presented in a permanent ADAS display in the top portion of the central display. An icon is also presented in the cluster during warnings. The ADAS display is permanent and does not change based on other information shown in the central display.</p> <p>A good level of warning is shown in the ADAS display during an event with the corresponding lane line illuminating and flashing orange along with a clear and distinctive audible warning. The LKA/LDW ISO icon is used to show an additional visual warning in the cluster. In the settings screen, the user can choose to adopt the 'recommended settings' for a quick setup or customize them to their preferences.</p>	<p>Three visual warnings are given for BSM in three separate locations throughout the HMI. While the warnings are noticeable, they are distracting when purely notifying of a vehicle's presence. When the vehicle is below the minimum speed for operation, no level of indication is given in the HMI to inform the user of this.</p>	
UX impact	Minor Positive	Minor Negative	
SBD viewpoint	<p>The warning icon shown in the cluster does not depict which side of the lane is being crossed and offers very little detail. The audio warnings given are not prioritized over infotainment volume and can become lost if the infotainment volume is high. Locating the main LKA/LDW warnings in the central display means users must look right (Left Hand Drive) to be informed of a lane departure happening on the left. This causes disorientation. No lane tracking status is provided in any of the displays to show system status. The difference in HMI between LKA and LDW is so subtle that it could easily be missed. When LDW is chosen and permanent icon is show in the cluster with slight difference to that of the LKA warning icon.</p>	<p>The ISO BSM icon is used in the side mirrors as part of the visual warning. This helps to link the warning to the system clearly. When a vehicle is detected in the blind spot, the icon in the mirror, wave in the central display and segment in the cluster illuminate orange. When indicating into the path of this vehicle all the graphics begin to flash and an audio alert is given.</p> <p>Orange propagating waves shown behind vehicle graphic in central display when vehicle detected. Audio warnings are prioritized over infotainment volume and can be clearly heard in all scenarios. A door opening warning utilizes the BSM system to provide extra alerts when the vehicle is stationary and a vehicle is approaching. In the settings screen, the user can choose to adopt the 'recommended settings' for a quick setup or</p>	

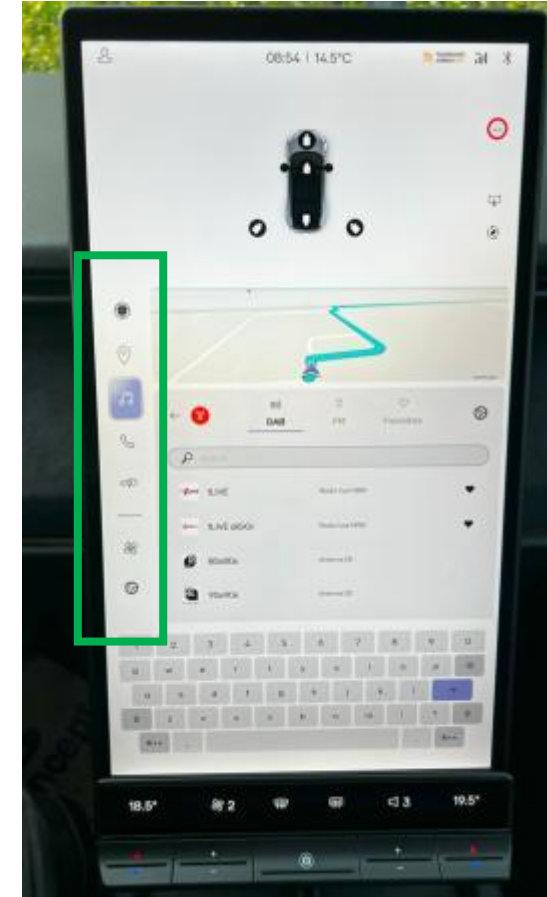
# Permanent shortcut bar enables quick access

SBD  
viewpoint

The side bar menu provides quick access for various features.

- A permanent shortcuts bar is shown down the driver's side of the central display, or along the bottom when in landscape orientation. This shortcuts bar provides quick access to all of the main features and helps to create a shallow menu structure throughout the system.
- The side bar menu provides permanent access to the home screen from any page within the central display. Being positioned down the driver's side of the screen, the driver can access and operate this menu bar without moving their hand too far away from the steering wheel.

The permanent menu bar is a good way of anchoring quick access to the commonly used features within the system. One improvement could be to make this bar customizable in order to add even more flexibility and personalization.



Permanent shortcuts bar





# No IoT offering

SBD  
viewpoint

No IoT integration is offered as part of the system yet.

- IoT integration is severely lacking as part of the feature offering in this system. No supplier of IoT such as Google or Amazon has been integrated into the system.
- The lack of IoT means the user is unable to interact with any smart home devices or automated smart systems outside of the vehicle.
- Amazon Alexa is expected to be introduced in a future update, however at the time of testing this feature was not present.


While IoT integration in vehicles is still in relevant infancy, it is becoming ever more popular and common. OEMs should consider this in order to not get left behind in terms of in-cabin feature offerings.



No IoT offering



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The thumbnail features a photograph of a car's interior, showing the steering wheel and a large vertical infotainment screen. Below the photo is a blue banner with the SBD logo and the report title. At the bottom of the thumbnail is a blue button with the text "Request price" and a white right-pointing chevron.



# Contact SBD Automotive

## Do you have any questions?

If you have any questions or feedback about this research report or SBD Automotive’s consulting services, you can email us at [info@sbdautomotive.com](mailto:info@sbdautomotive.com) or discuss with your local account manager below.



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