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Renault Megane E-Tech

The Megane's OpenR link system is doubly surprising: firstly, a new system on a new EV platform that demonstrates a relatively high level of stability, and secondly, a Renault system that manages to score significantly higher than many industry leaders. With large screens, a positive user experience, a flat information architecture, highly responsive interactions and a pleasing level of functionality, the overall impression is of a premium system that for the most part succeeds in carrying over the slick experience of a high-end tablet interface into the car.

COVERAGE	FREQUENCY	PUBLICATION FORMAT	PAGES
GLOBAL, NA, CHINA, EUROPE	ANNUALLY, QUARTERLY, 6 CARS PER YEAR	PDF, POWERPOINT, EXCEL, ONLINE	150+

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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).
- **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.

This research is useful for

- PRODUCT PLANNERS
- USER EXPERIENCE
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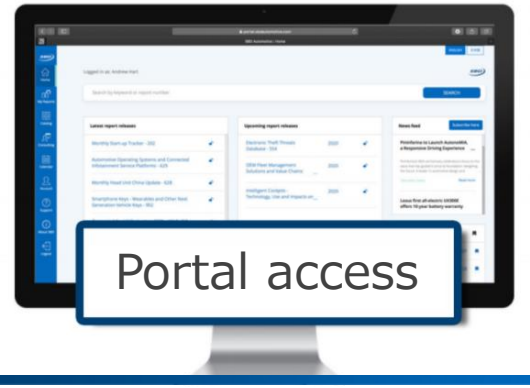

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July 2022

In-Car HMI UX Evaluation & Benchmarking
Renault Megane E-Tech

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Introduction

Aim of this report

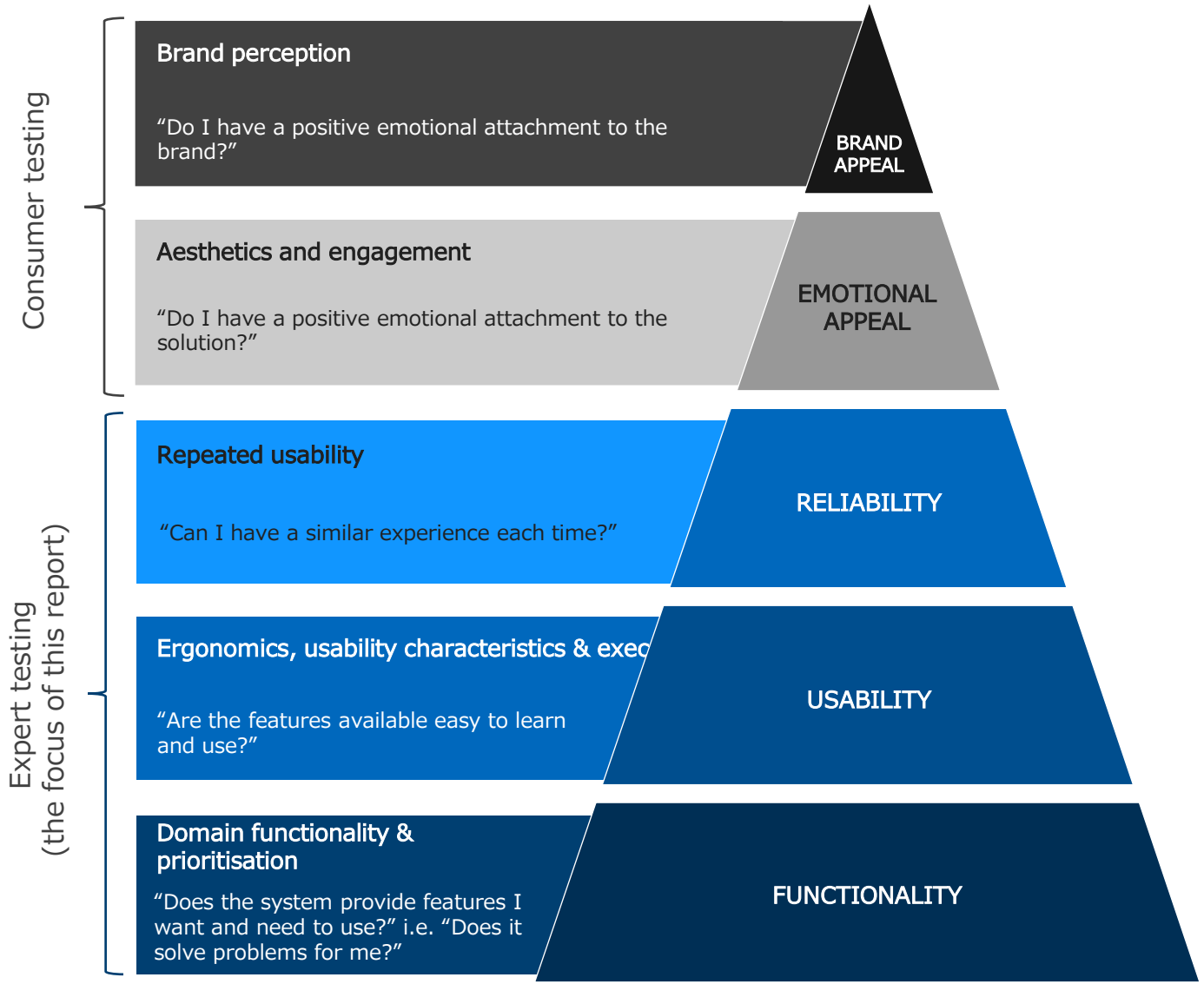
Welcome to the 2022 HMI benchmarking report series. This report has been created to provide a fair, unbiased and objective view of the latest in-vehicle HMI solutions in the European, US and Japanese markets. Evaluations are carried out by SBD usability experts with a deep understanding of CASE domains 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.

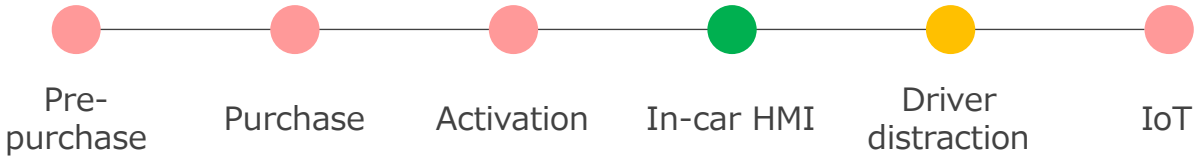
All viewpoints and analysis within the report are aimed defining areas of concern through a data driven approach. This report aims to benchmark and score solutions whilst also being able to provide actionable recommendations to design and development teams.



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 may 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

2022 vehicle list

SBD has chosen six cars to evaluate in 2022, 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 year has seen release dates slipping significantly, so it may be necessary to make substitutions.

Cars tested

Lucid Air

- Potential disruptor
- Multiple displays
- US market test

Rivian R1T

- New disruptor
- Appears to have an innovative approach to HMI
- US market test

Renault Megane E-Tech

- LG's new Android Automotive IVI
- French market test

Awaiting test

Xpeng P5

- High level of ADAS
- Advanced voice recognition
- Configurable avatar
- China market test

GMC Hummer EV

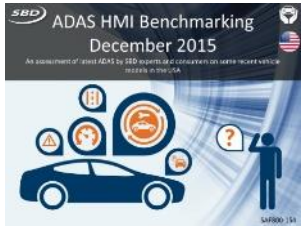
- GM's new Android OS system
- Unreal Engine graphics
- US market test

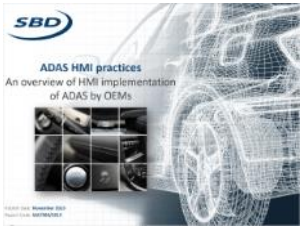
Lexus NX

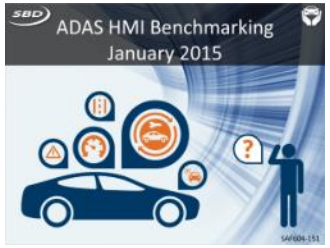
- New Lexus system
- Cloud-based navi
- New voice recognition
- German market car, UK test

SBD experience through years of testing in-car solutions

Over the last nine years SBD has evaluated 96 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)	✓	✓	✓	✓	✓	✓	✓	

Example slides from the full 150+ page report

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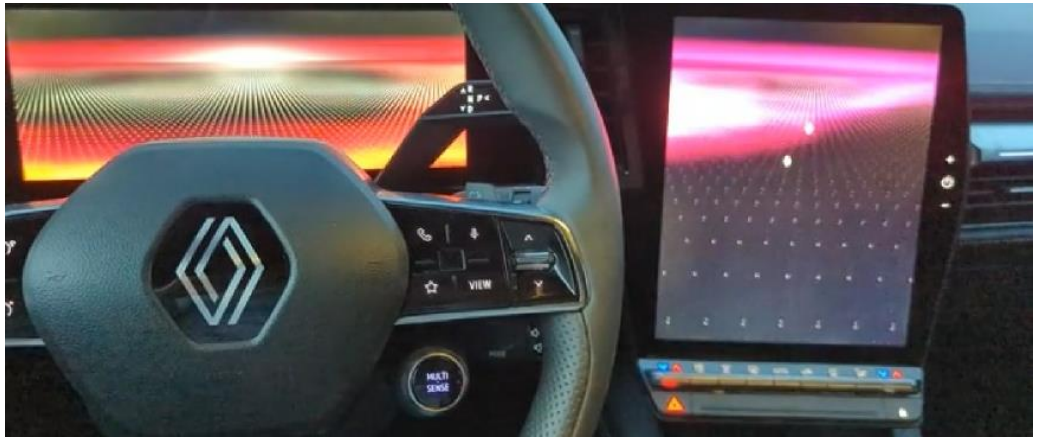
Few delight features, performance features mostly well implemented

Delight feature considerations:

- The Megane has few delight features. The only particularly noticeable one is the start-up sequence, which greets the driver as the system starts.
- Some IoT functionality is offered via Google Assistant, but this is a relatively invisible offering and requires specific commands to be able to operate successfully.
- A final minor feature is the accurate representation of external lights on the ADAS display in the instrument cluster. While only a small point, it emphasises the attention to detail evident throughout the system.



Start-up sequence is a minor ‘wow’ feature

The Megane features a visual and auditory start-up sequence that begins about a second after the driver’s door is closed, timed to occur when the driver is sitting in the seat. The sequence spans both screens effectively, feels on-brand and raises anticipation, particularly for new owners. This is expected to appeal to the majority of users.

Performance feature considerations:

- Performance features are mostly well implemented and expected to please users, particularly the connected media offering.
- The display configuration is expected to delight customers, with two large, clear, high-resolution screens.
- The ADAS display is executed effectively and clearly, offering a good balance of information.
- The lack of a HUD is a disappointment, although not specifically an expectation.
- The parking camera system is more difficult to access than it should be.

Impressive display configuration

The system comprises two HD (167 PPI) screens: a 12.3-inch instrument cluster and a 12-inch portrait display, slightly angled towards the driver for improved viewing and reach. Both screens offer a high level of contrast, good colours, deep blacks and barely any lag was experienced throughout testing. Overall, the interface is very pleasing to use, delivers a high level of perceived quality and gives the impression of a system consistent with a higher segment car than the Megane.

Issue with parking sensors

3. ADAS

On one occasion, the error message ‘Parking sensors unavailable’ showed on the instrument cluster in white text, followed by ‘Check parking sensors’ in yellow. This remained for a few minutes, then was not seen again.

Frequency	**Low**	Medium	High
Severity	Minor	**Major**	Critical

Key lowlights

The stalk layout is cluttered and partially obscures the instrument cluster

Column stalks cluttered

Initial misoperation of wipers likely, obscuration issue

On the right-hand side of the steering column, three stalks plus a paddle are provided in this limited area of space.

Particularly when a novice user is initially learning the HMI layout and hasn't fully adapted to the functionality of this vehicle, there is a reasonably strong chance that users will bring prior experience of other vehicles (e.g. Tesla Model 3, Mercedes-Benz) with a single stalk on the right which is used to select the drive position.

With three stalks in the Megane, this means that this prior experience can lead to the user operating the incorrect stalk – often the wiper stalk when attempting to select the drive position.

A similar and related concern exists with the audio control stalk, which is uncommon practice in the automotive landscape today and risks adding distraction for users not familiar with the control location or operating logic.

A further issue with this configuration is that the instrument cluster is partially obscured by the drive position stalk.

Perceived Quality: Tactile

Level 1	Tactile
SBD viewpoint	**Stiffness & looseness:** No wobble was experienced at all, other than a very small amount in the steering wheel paddles, however this was considered acceptable. Overall, the HMI gives the impression of being appropriate to a higher segment vehicle. **Force feedback:** No haptic feedback for the display, but responsive and consistent touch input increases sensation of a quality interface. Feedback from steering wheel and HVAC controls is firm and pleasing, giving the impression of a high-quality interface. **Material quality:** The feel of all buttons/stalks/displays provides an impression of good quality, exceeding expectations. All plastics in frequently touched areas meet or exceed expectations. **Material harmony:** Tactile quality is consistently high throughout the vehicle. **Geometric & Positioning:** All controls convey a sense of good quality and for the most part surpass the brand identity.

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

SAE Level 0 ADAS: System usage

System usage: LKA

Visual warning after lane deviation with assistance display

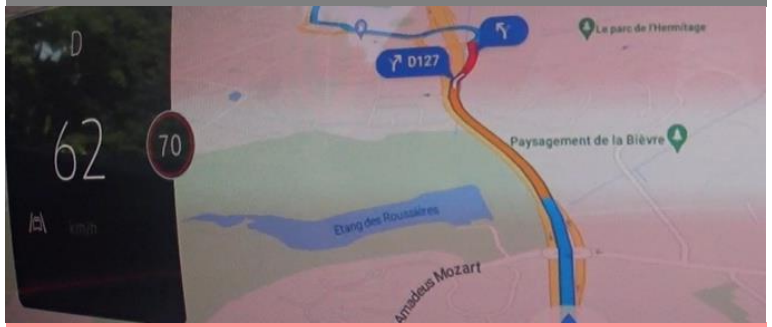
System usage: BSM

LED warning shown in mirror with ISO icon

System usage: RCTA

Good visual warning in infotainment

System usage: LKA



Lack of individual lane tracking and warning when not in assistance display

Pleasing screen configuration

Category	Infotainment
Description	Large, high-resolution instrument cluster and central display
SBD viewpoint	The Megane OpenR link system comprises two HD (167 PPI) screens: a 12.3-inch instrument cluster and a 12-inch portrait (or 9-inch in the lower configuration) TFT central display, provided by Continental. • Brightness is adaptive and the instrument cluster features 'micro-blinds' technology, similar to desktop privacy screens, to shield the screen from sunlight. • In use, the screens mostly function very effectively with a high level of contrast, good colours, deep blacks and barely any lag experienced throughout testing. • The central display is angled slightly towards the driver to improve reach and viewing. • The only issue observed was that in direct sunlight (rarely experienced) the central display's high-gloss finish suffered from high reflectivity, showing fingerprints excessively and making the screen barely legible. Overall, both displays are very pleasing to use, deliver a high level of perceived quality and give the impression of a system consistent with a higher segment car than the Megane.

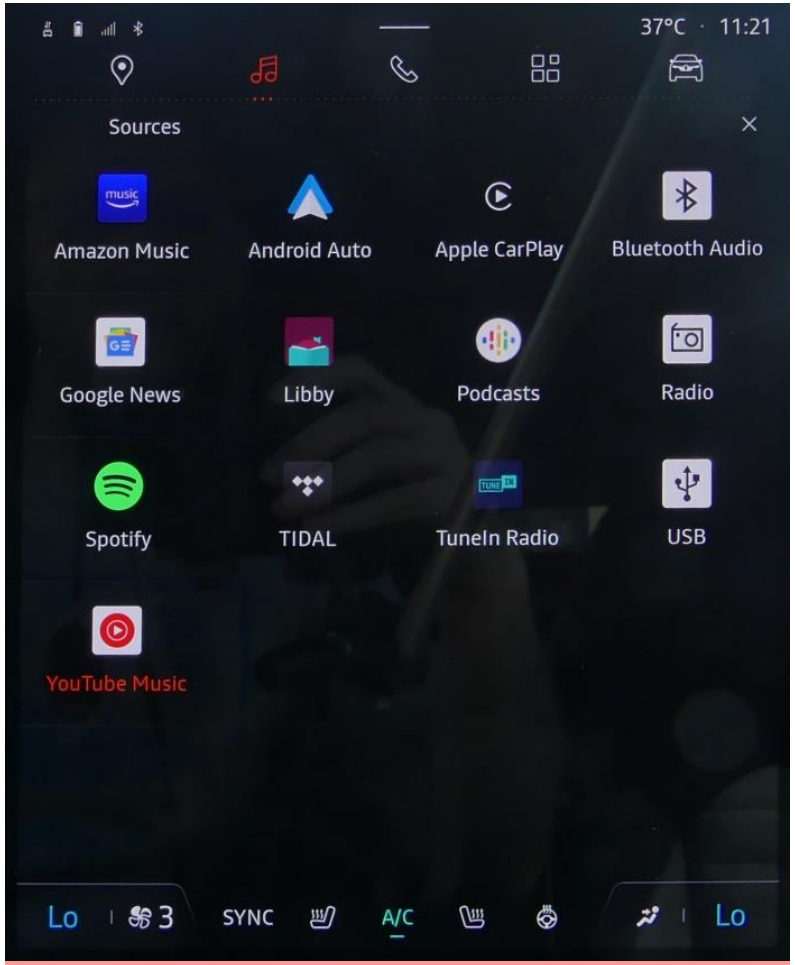
UX impact	Major negative	Minor negative	No impact	Minor positive	Major positive

Large amount of screen estate offered

Source selection screen is confusing and requires prioritisation

Category	Radio/Media
Description	Sources screen is unintuitive and hard to use
SBD viewpoint	The sources screen lists all sources alphabetically without prioritisation. • Because sources are listed alphabetically, if a new source is installed, it will displace some or all of the other sources (depending on how close its initial is to the beginning of the alphabet). This causes issues as users form a mental image of the page layout (in the example the Radio shortcut is middle-right) and installing new apps disrupts this. • Cycling through the sources using the stalk control on the steering column currently goes through every source. • SBD recommends several modifications to the current format: 1. Show a 'priority apps' section at the top with space for up to eight apps. Cycling through sources would just show these. 2. Provide a system default setting with e.g. Radio, Bluetooth Audio and Spotify (if installed) at the top. 3. Show all other apps below (e.g. divided by a horizontal bar). 4. Allow users to move apps between the two sections as well as changing the order within sections. 5. Add any new apps to the end of the lower list. 6. Move Android Auto and CarPlay to the apps screen. Implementing these changes would make this section far easier to use and maintain consistency as apps were added over time.

UX impact	Major negative	Minor negative	No impact	Minor positive	Major positive

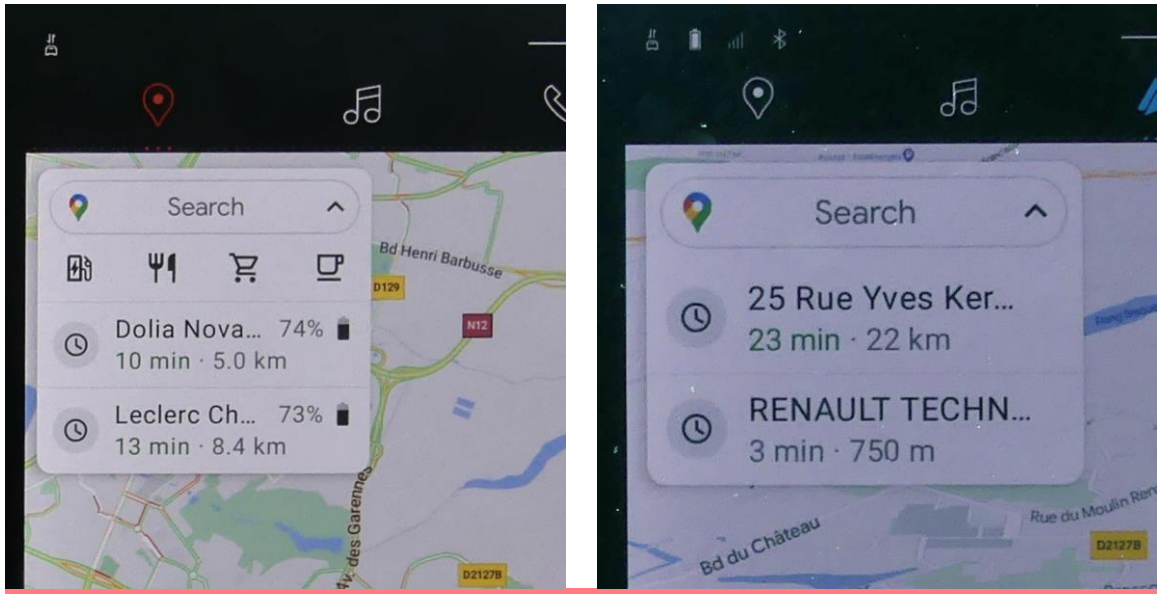


App listing changes each time an app is added

Touchscreen inputs should be enlarged to meet recommendations

Category	User input
Description	Touchscreen inputs are smaller than recommended
SBD viewpoint	Input elements within Maps are smaller than recommended. • The navigation search box is approximately 9mm tall, below the recommended size which is a minimum of 12-13mm. • Further buttons and inputs are also less tall than optimal, and all elements can be hard to operate when driving. • When Android Auto is run on the same system, the search box is approximately 12mm tall. While this gives a 'lower resolution' impression, it is far more usable, particularly when driving. It is important to ensure that input areas are sufficiently large to meet guidelines. The current configuration requires more time and concentration to interact with than Android Auto which is likely to lead to an increased level of distraction.

UX impact	Major negative	Minor negative	No impact	Minor positive	Major positive



Comparison of input boxes on Android Automotive (left) and Android Auto (right)

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