

# Car HMIs

Decades of rising complexity

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# BACK TO THE 80S



## Cluster

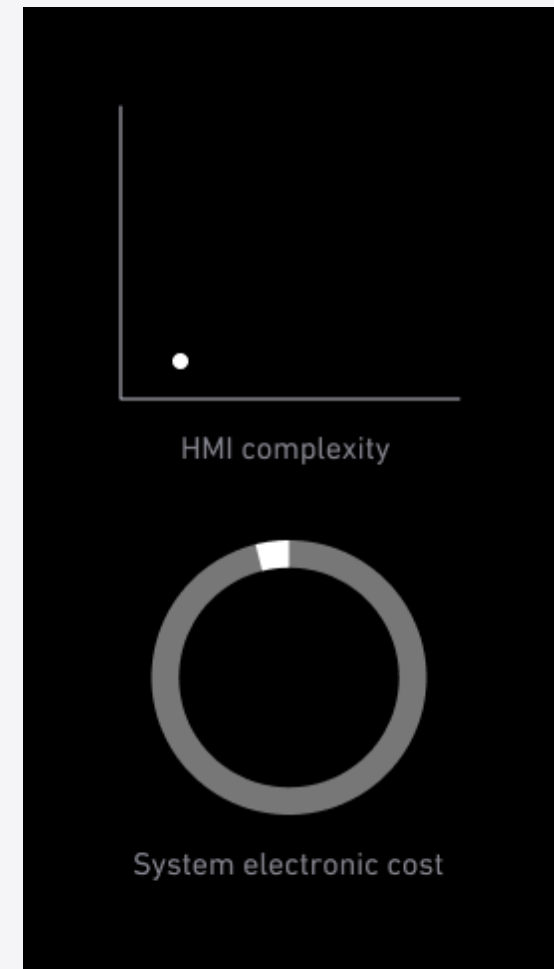
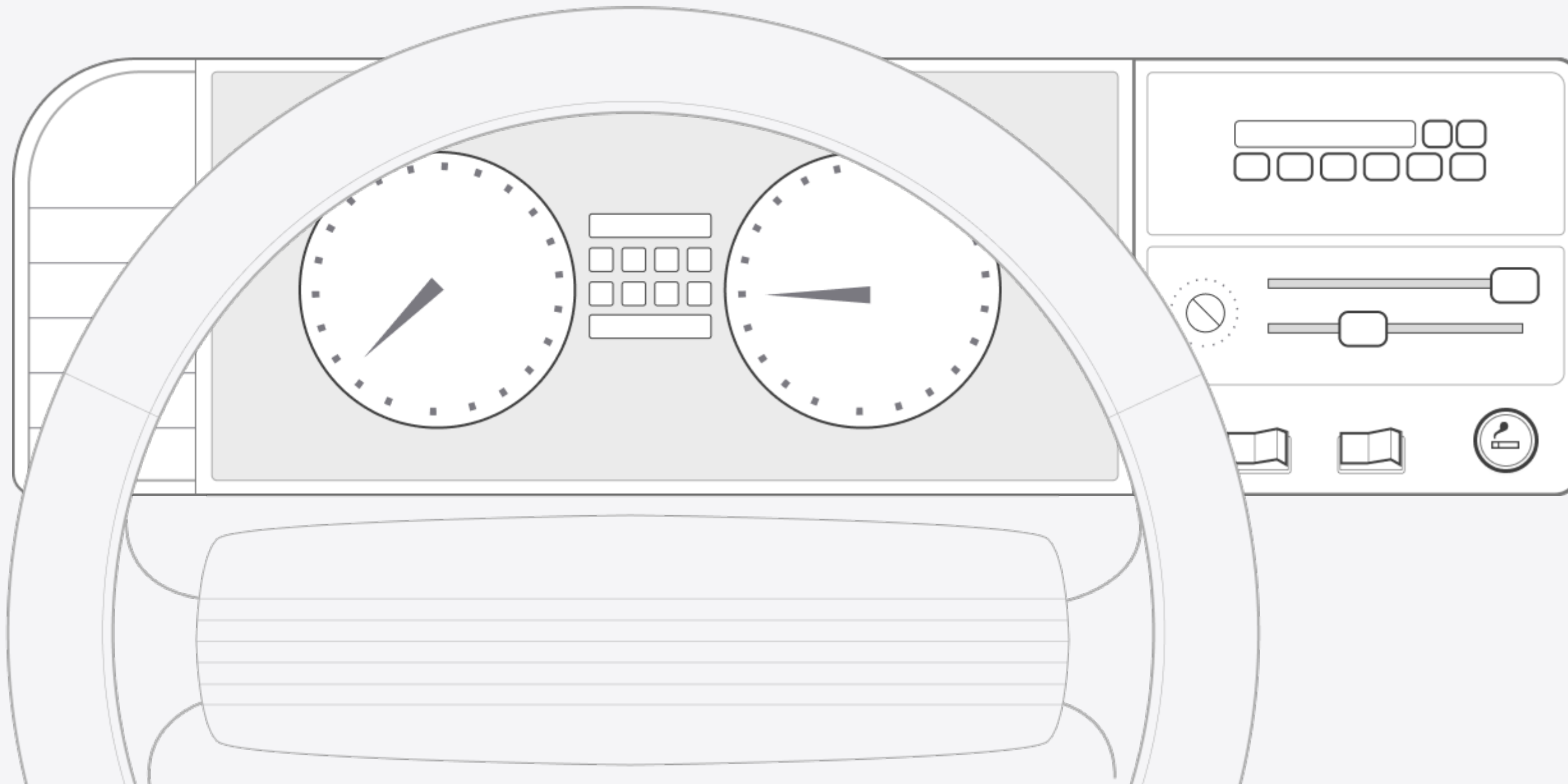
Instruments  
Warnings + indicators

## HMI Inputs

Mechanical knobs + levers + dials + sliders

## Interior Add-Ons

Entertainment: radio + cassette deck  
Comfort: heating + ventilation  
Cigarette lighter



**'80s**

'90s

'00s

'10s

Today

Tomorrow

## Cluster

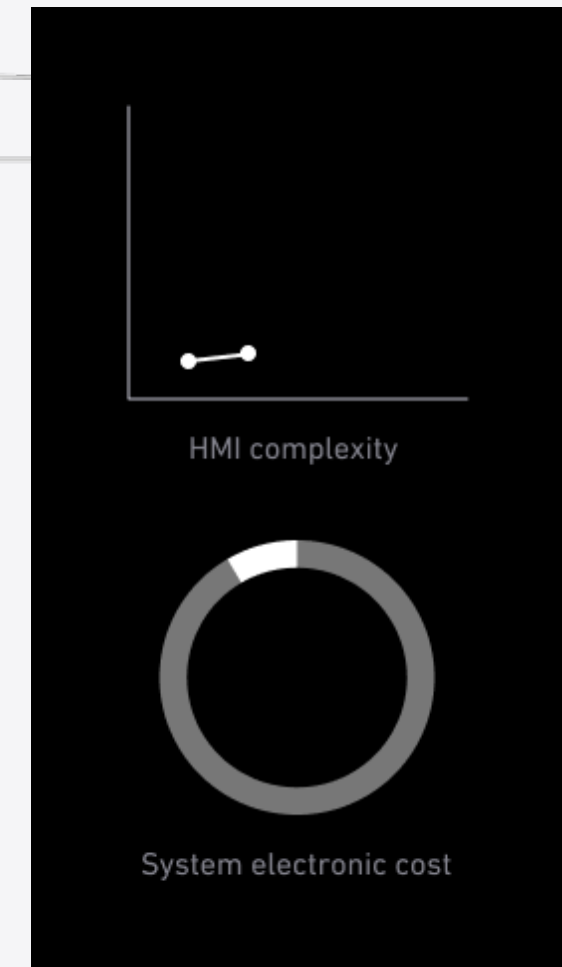
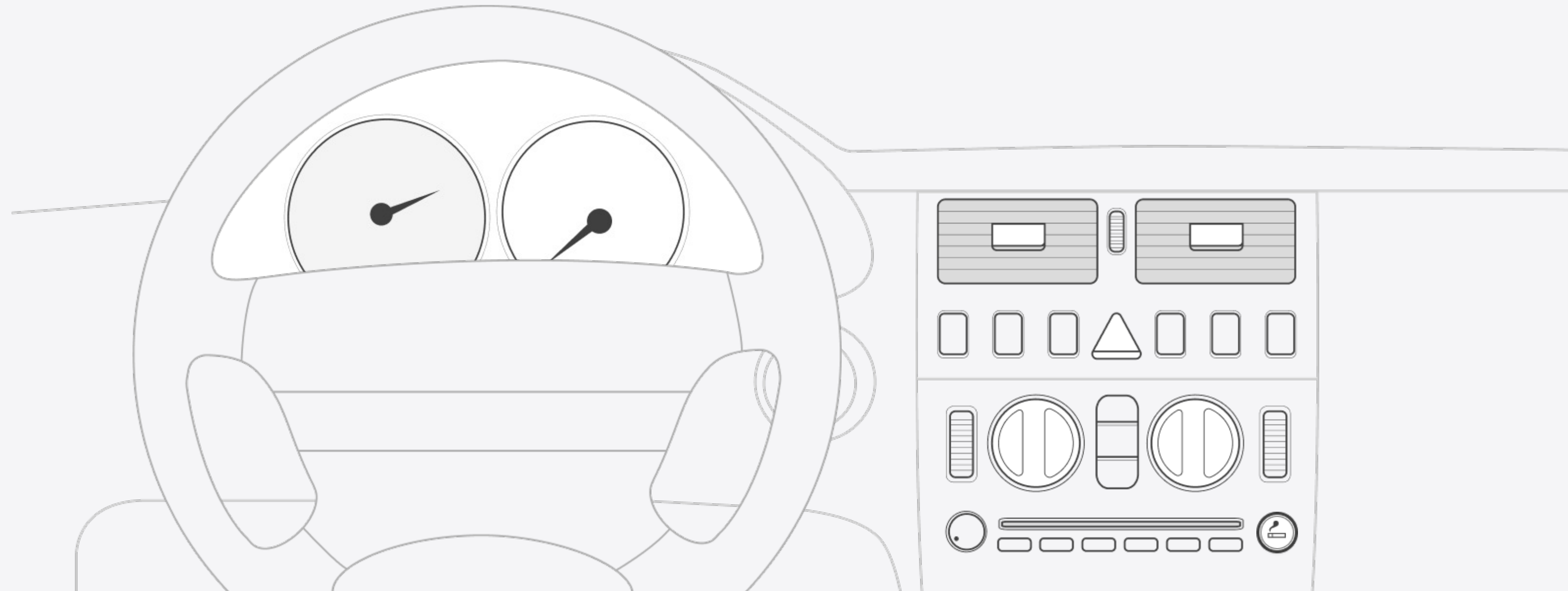
Instruments  
Warnings + indicators

## HMI Inputs

Mechanical knobs + levers + dials + sliders

## Interior Add-Ons

Entertainment: radio + CD player **REPLACEMENT**  
Comfort: heating + ventilation+ AC **NEW**  
Cigarette lighter



'80s

**'90s**

'00s

'10s

Today

Tomorrow

## Cluster

Instruments  
Warnings + indicators  
Basic ADAS **NEW**

## HUD

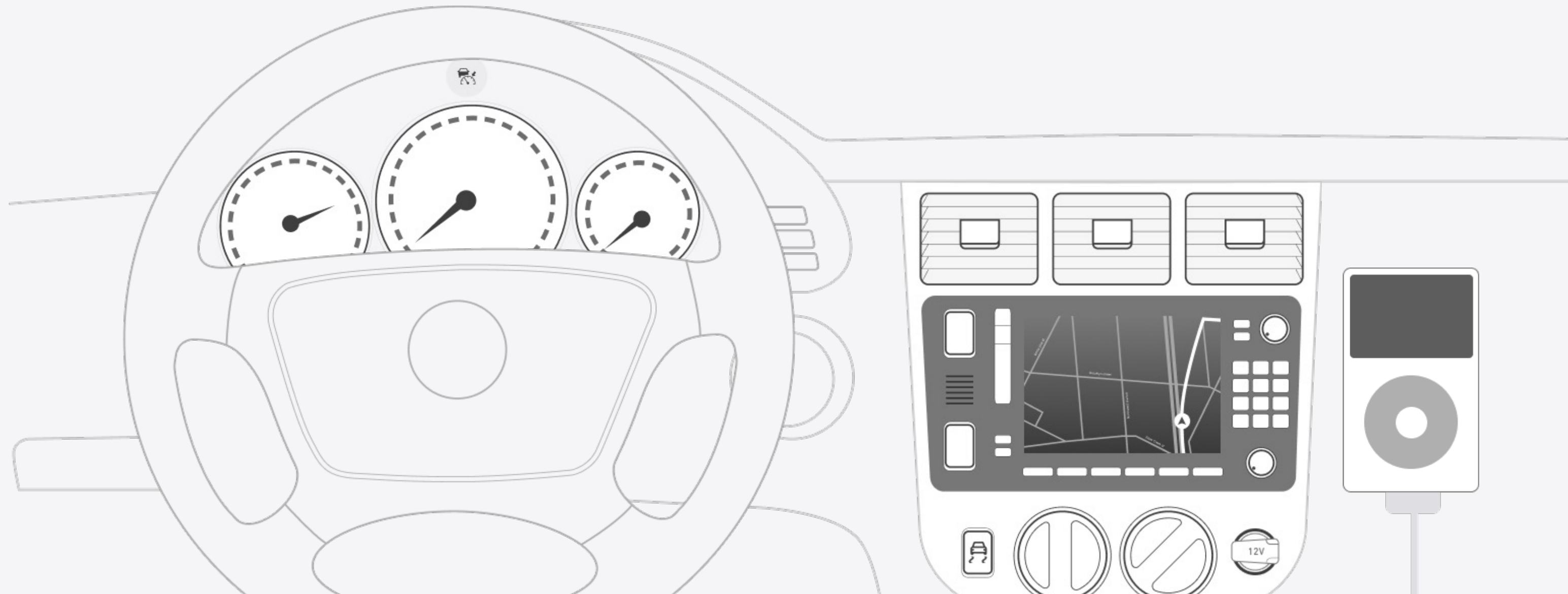
Warnings + indicators

## HMI Inputs

Mechanical knobs + levers + dials + sliders

## Infotainment

Entertainment: radio + CD player  
Comfort: heating + ventilation+ AC  
Navigation **NEW**  
Portable audio players **NEW**



'80s

'90s

'00s

'10s

Today

Tomorrow



## Cluster

Instruments  
Warnings + indicators  
Advanced ADAS

## HUD

Warnings + indicators

## HMI Inputs

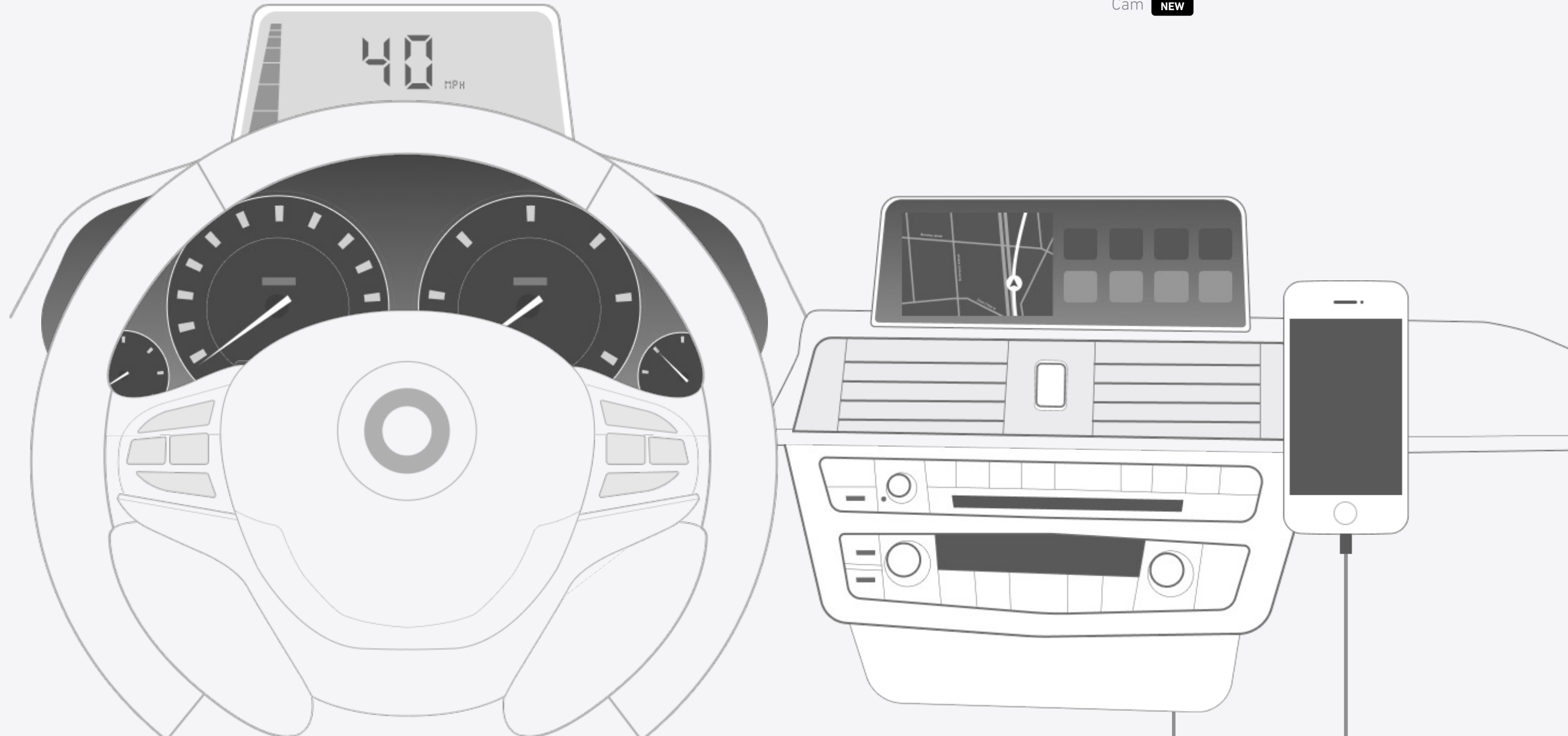
Mechanical knobs + levers + dials + sliders  
Touch **NEW**  
Voice **NEW**

## Infotainment

Entertainment: radio + CD player  
Comfort: heating + ventilation+ AC  
Navigation + traffic **PRO**  
Mobile device integration (phone + music) **NEW**  
Car settings **NEW**  
Cam **NEW**

## Ecosystem

Companion app **NEW**



'80s

'90s

'00s

**'10s**

Today

Tomorrow



## Cluster

Instruments  
Warnings + indicators  
ADAS level 2 **PRO**

## HUD

Warnings + indicators

## HMI Inputs

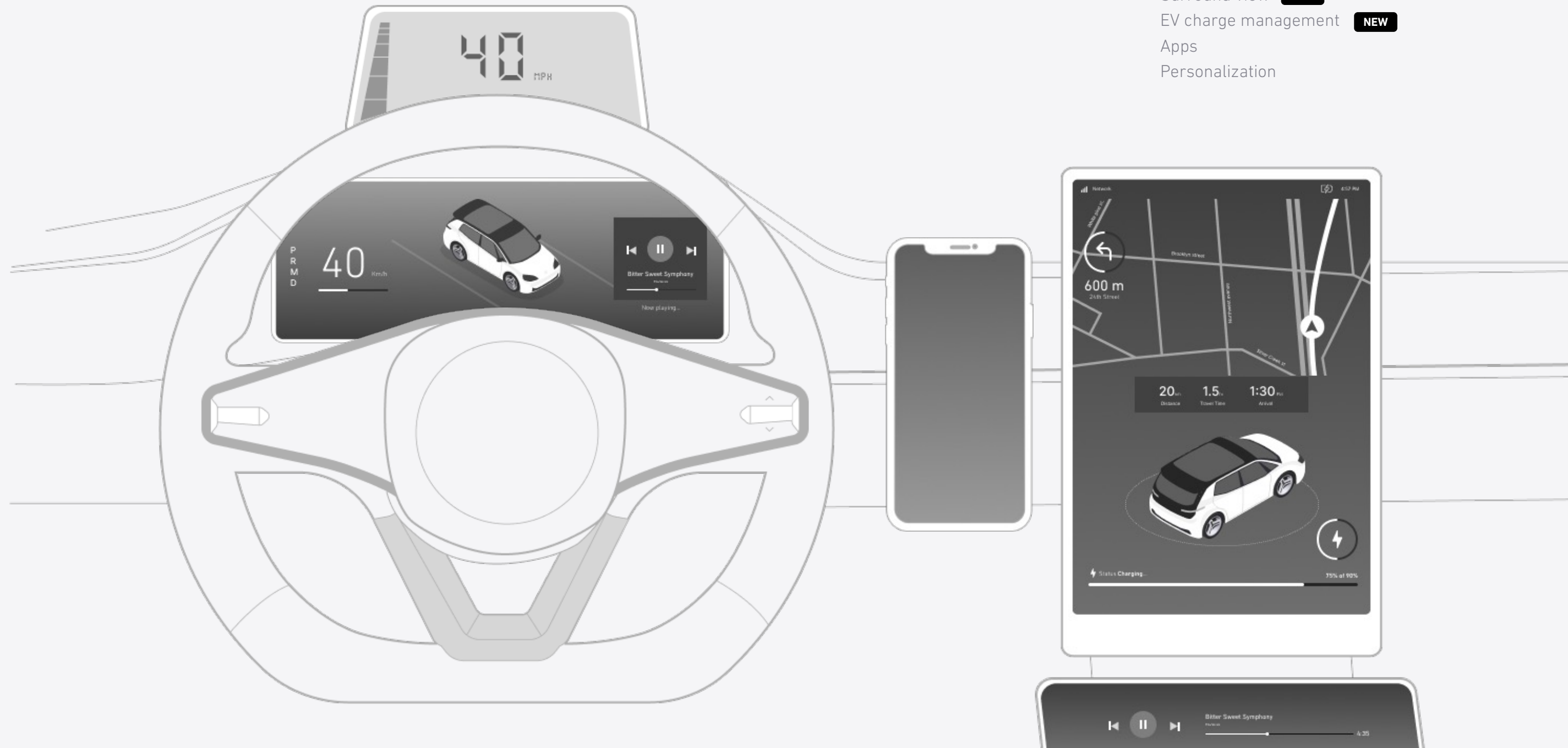
Mechanical knobs + levers + dials + sliders  
Touch  
Voice

## Infotainment

Entertainment: radio + CD player  
Comfort: heating + ventilation+ AC  
Navigation + traffic + POIs **PRO**  
Advanced car settings **PRO**  
Mobile device integration (phone + music)  
Surround view **PRO**  
EV charge management **NEW**  
Apps  
Personalization

## Ecosystem

Companion app **NEW**  
Integrated multiscreen **NEW**  
Cloud **NEW**



'80s

'90s

'00s

'10s

**Today**

Tomorrow

## Cluster

Instruments  
Warnings + indicators  
ADAS level 3+ **PRO**

## HUD

Warnings + indicators  
Augmented indication **NEW**

## HMI Inputs

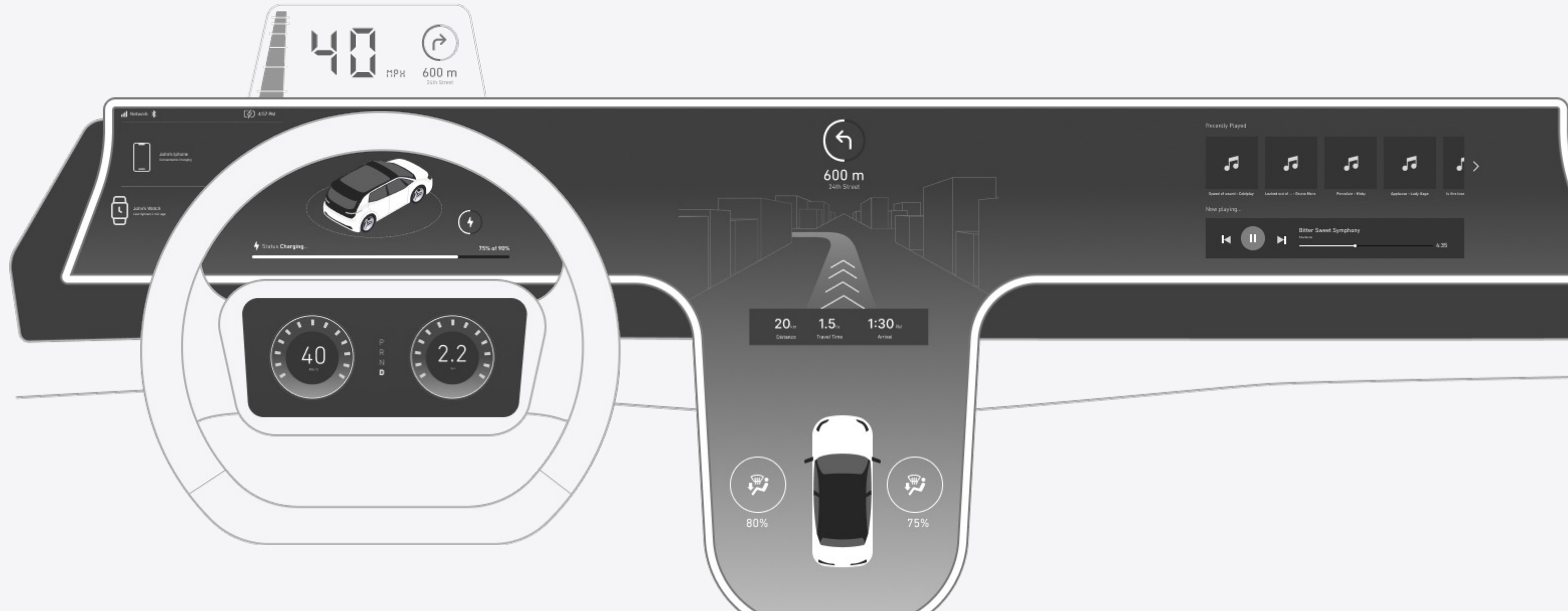
Mechanical knobs + levers + dials + sliders  
Haptic touch **PRO**  
Natural voice **PRO**  
Remote web access **NEW**

## Infotainment

Entertainment: radio + CD player  
Comfort: heating + ventilation+ AC  
Navigation in 3D Maps **PRO**  
Advanced car settings  
Mobile device integration (phone + music)  
Surround view + AR monitoring **PRO**  
Advanced EV charge management **PRO**  
App synchronisation **PRO**  
Personalization + user management **PRO**

## Ecosystem

Companion app  
Integrated multiscreen  
Cloud  
Smart devices + IoT **NEW**



'80s

'90s

'00s

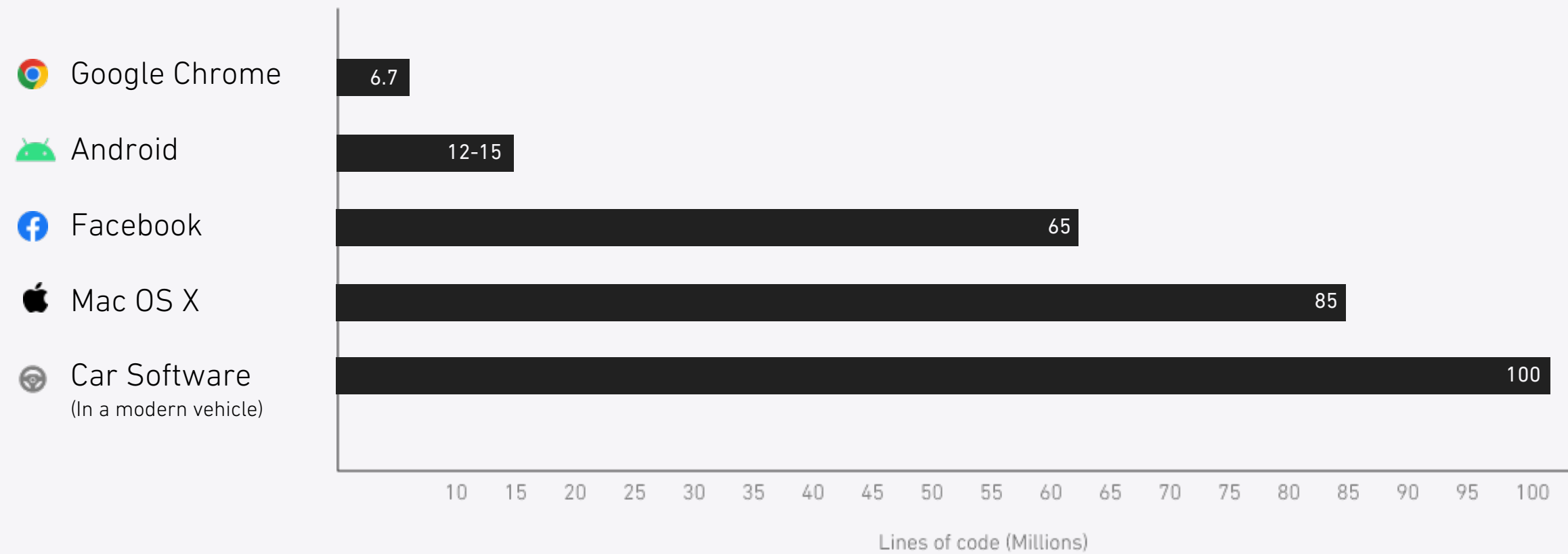
'10s

Today

**Tomorrow**



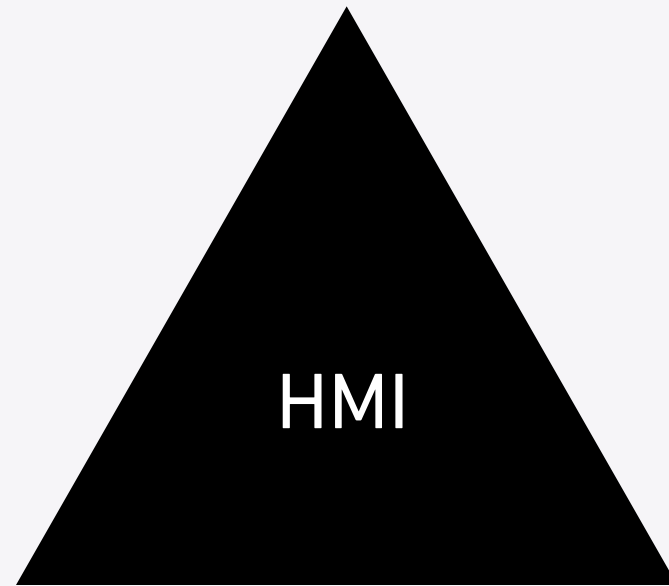
# Code Bases



Source: <https://www.visualcapitalist.com/millions-lines-of-code/>



Spinning faster and faster



More and more features added

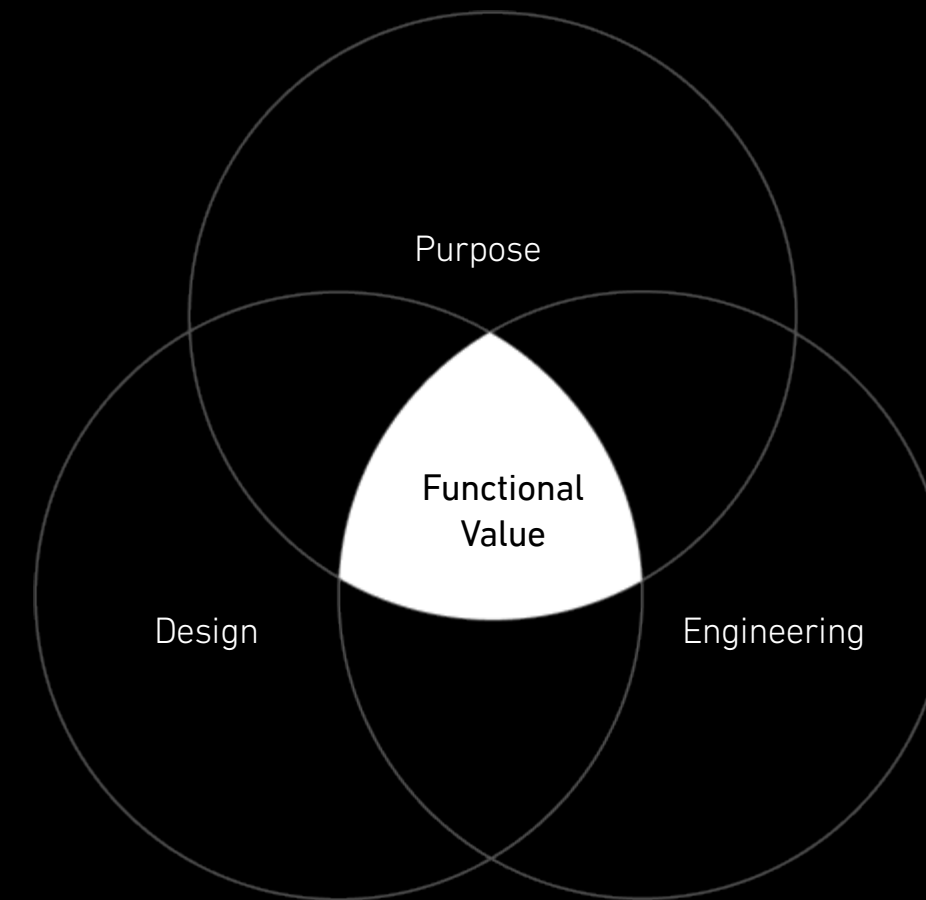


Evolution in progress

# Functional Value

Taming HMI complexity with seamless assistance

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# Seamless Assistance

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Rain-sensing wipers



Traffic jam assistance



Automatic emergency  
braking

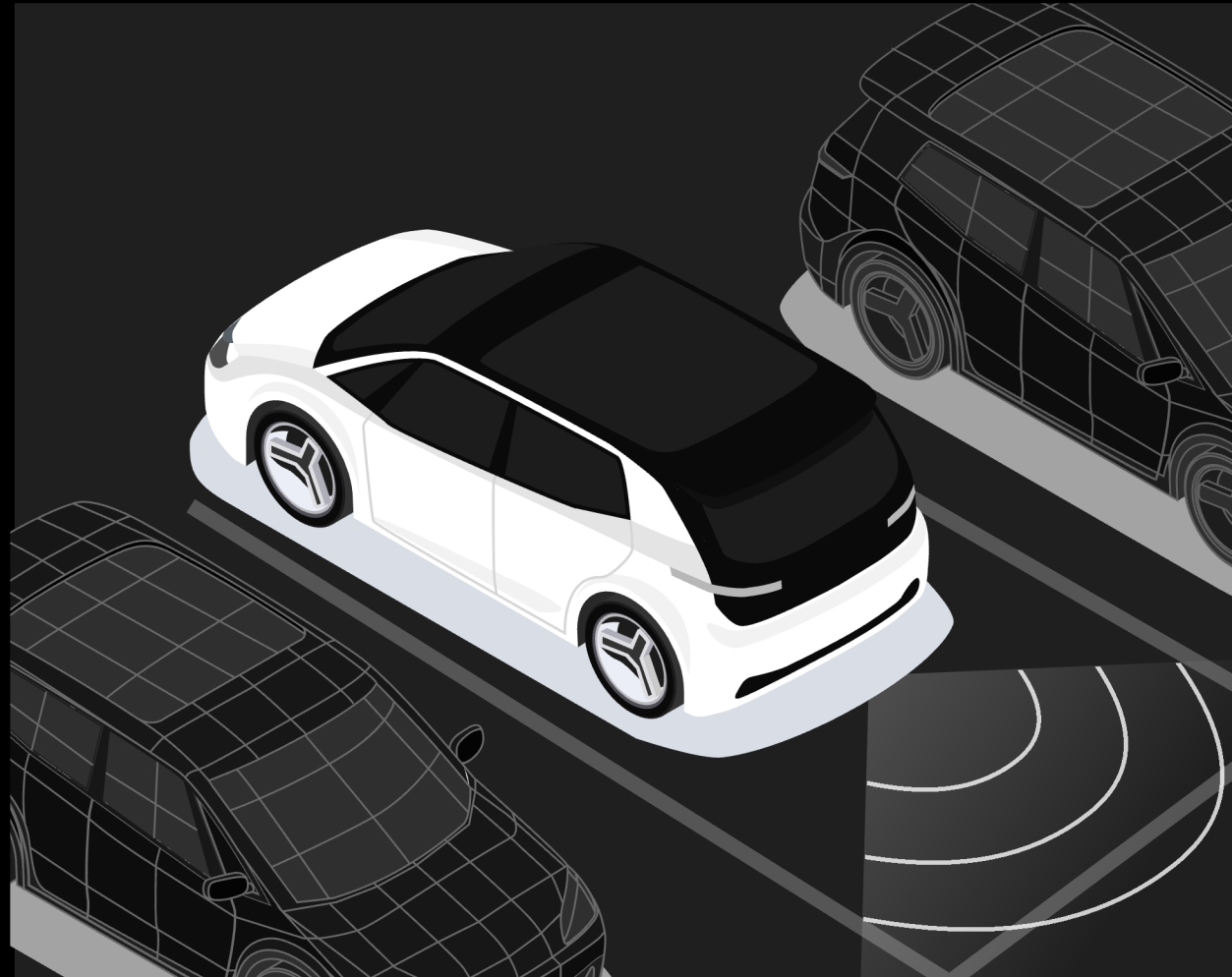


Blind-spot detection



Dynamic radio volume

# Advanced Surround View



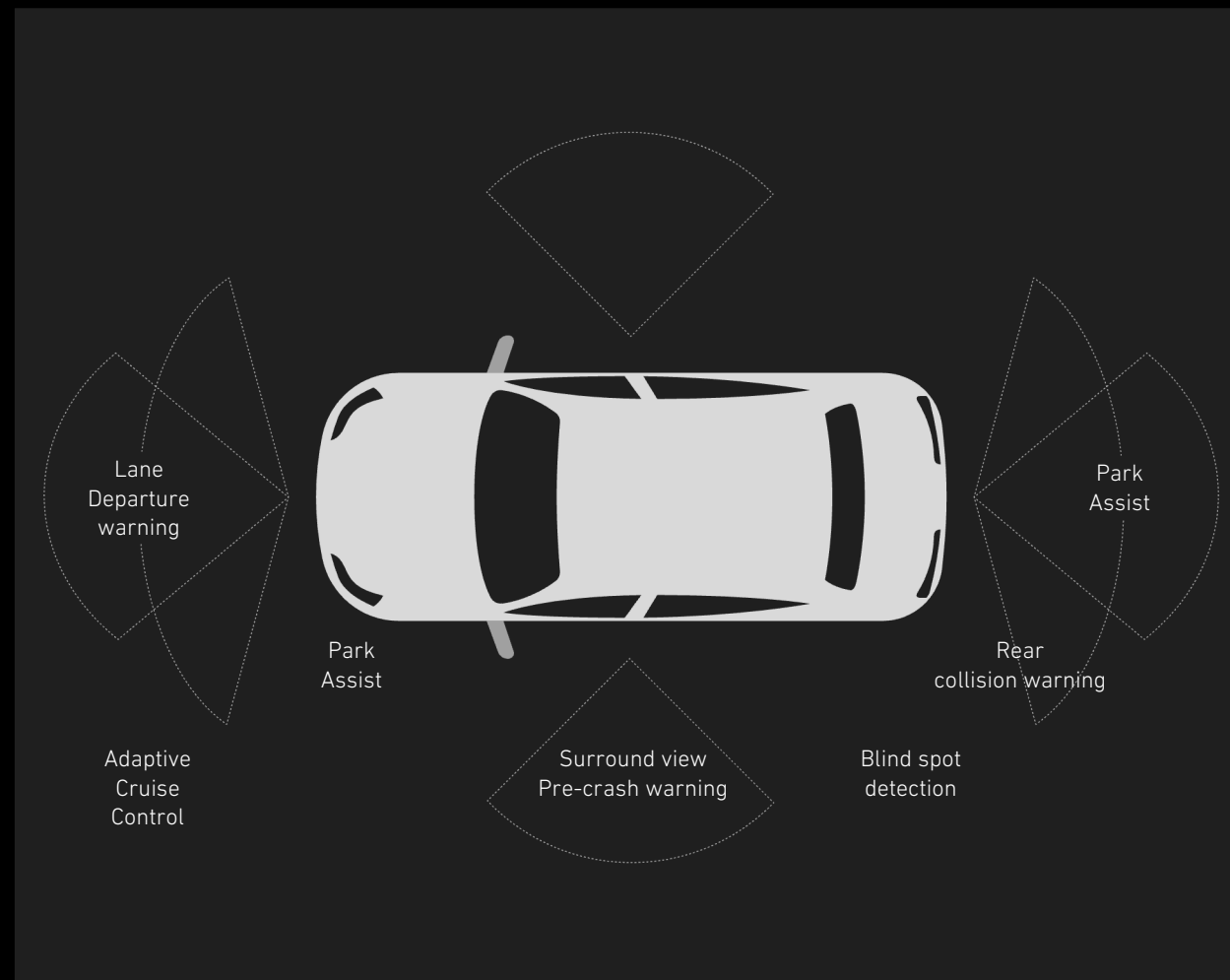
## Why?

1 out of 5 accidents happen in parking lots  
Back-over accidents kill people  
Backup cameras mandated in US since 2018





# 3D Animated ADAS



Why?

Consumers embrace ADAS features  
ADAS visualization builds trust in the vehicle





KANZI

12:45  
Thursday, Nov. 9

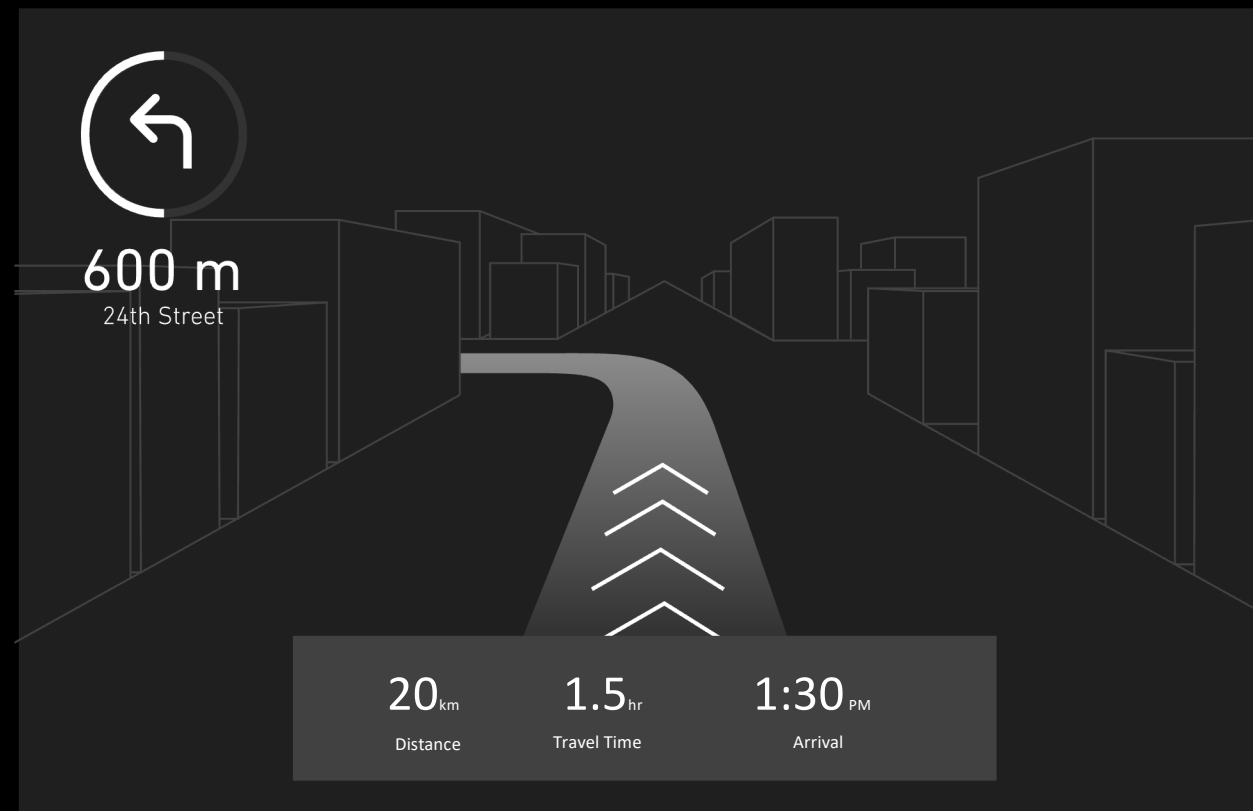


**Losin Control**  
Dustin Lynch - Tunnel Vision

**8** min  
**1,2** km  
**12:53** Arrival



# Augmented Reality Navigation



Why?

Distraction is the #3 cause of pedestrian fatalities – eyes on the road!





→ 245 km 50% CHR |

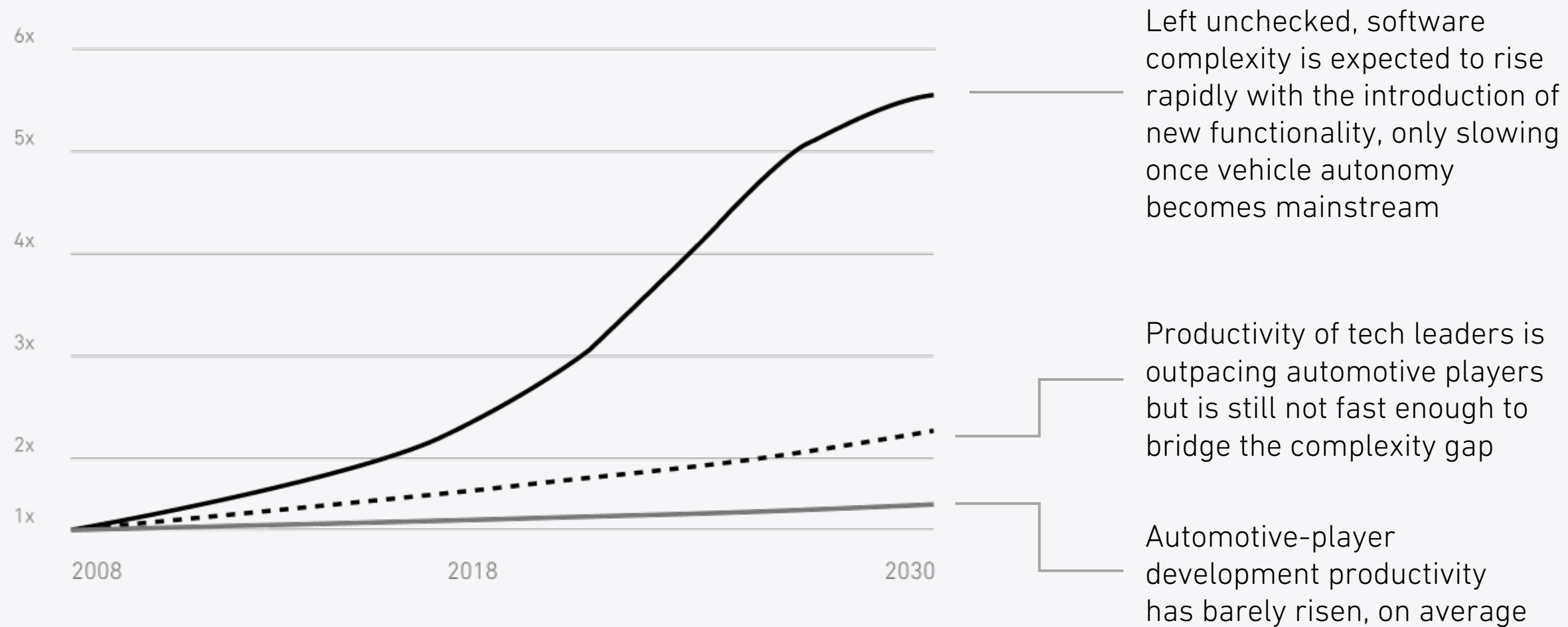
| PWR

KANZI ONE

19  
km/h

# Complexity in HMI Development

# The automotive industry and software complexity



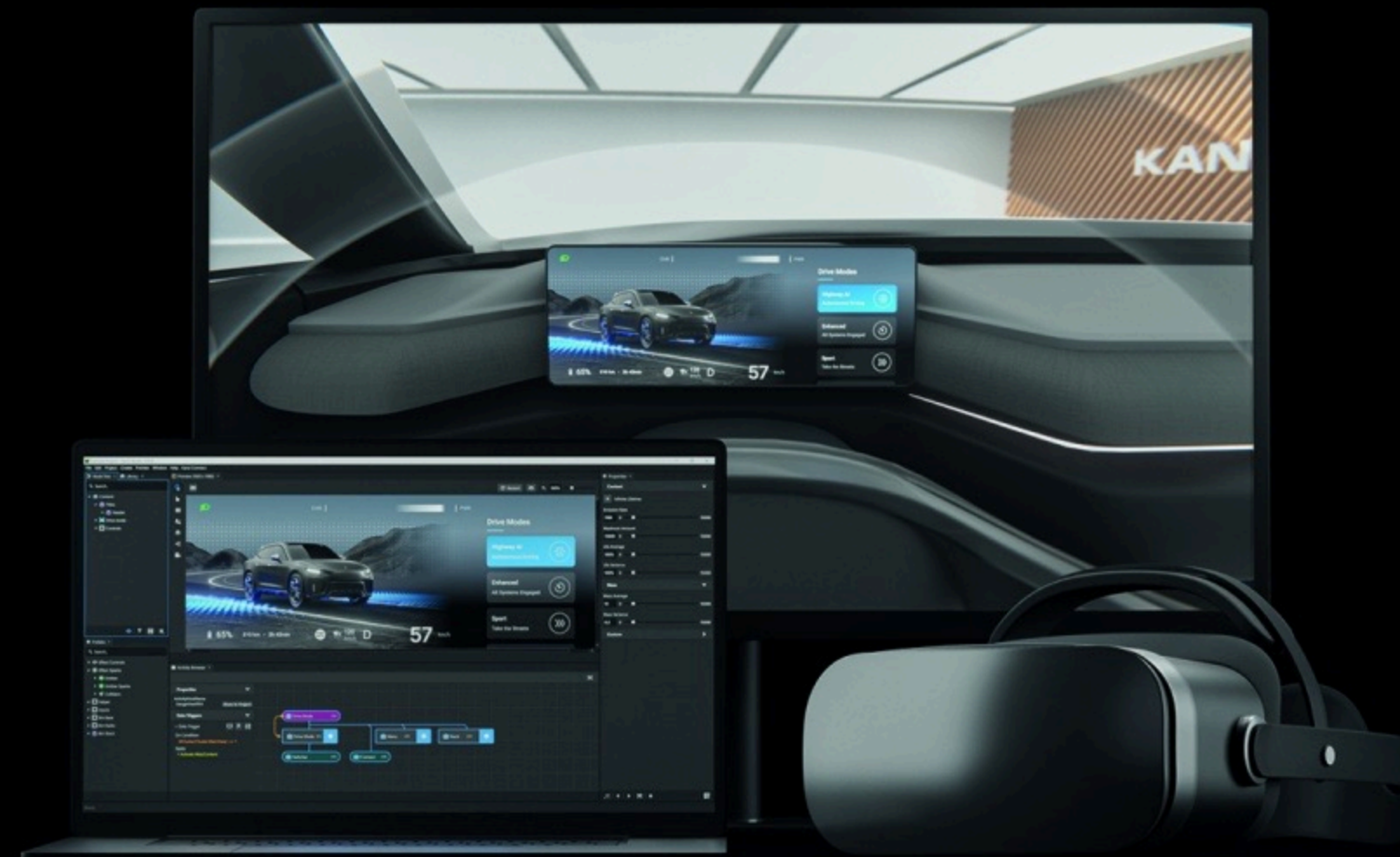
Software development complexity

Software development productivity, tech leaders

Software development productivity, automotive players

# KANZI<sup>®</sup> ONE

Taming complexity with a dedicated automotive toolchain



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