



# TUGA DIGITAL PLATFORM

an integrated overview by Aromni

# TUGA DIGITAL PLATFORM

an integrated overview

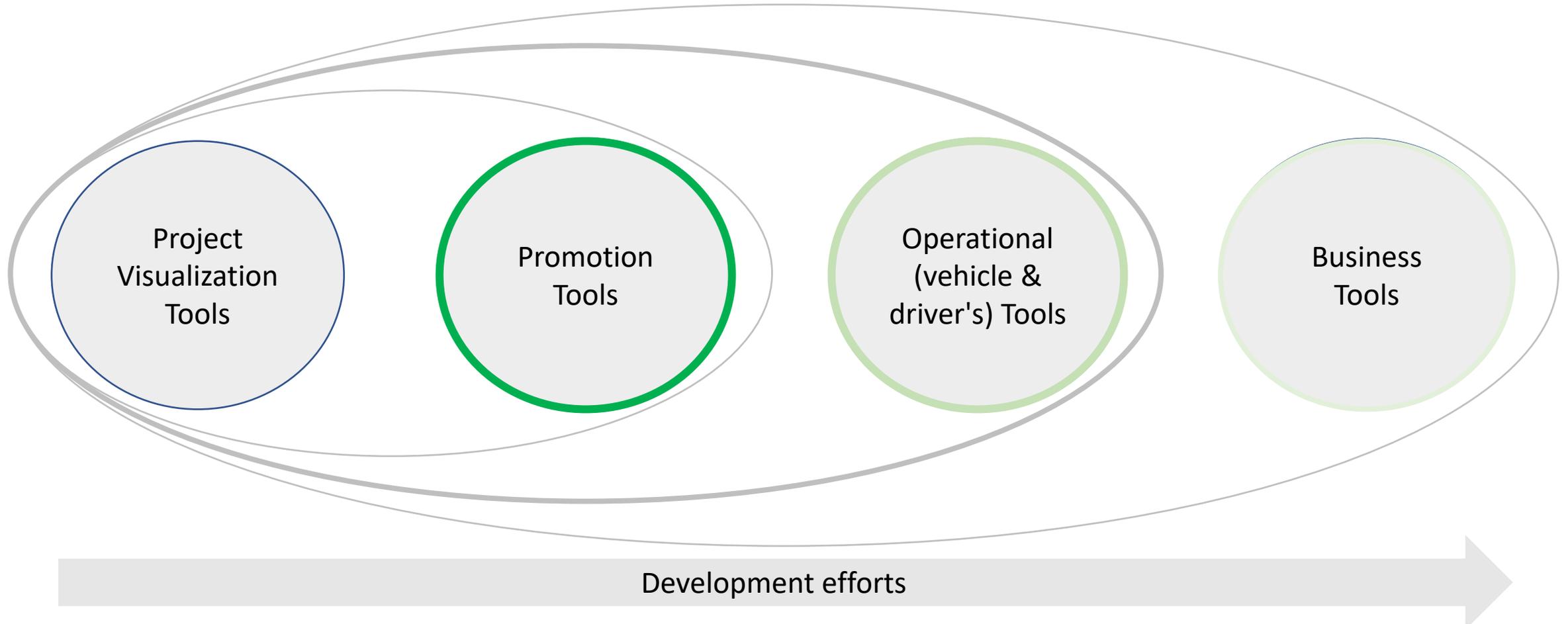
Project built from scratch

An integrated approach for all digital components

Looking to the present, pointing to the future, but also beyond that

# TUGA DIGITAL PLATFORM

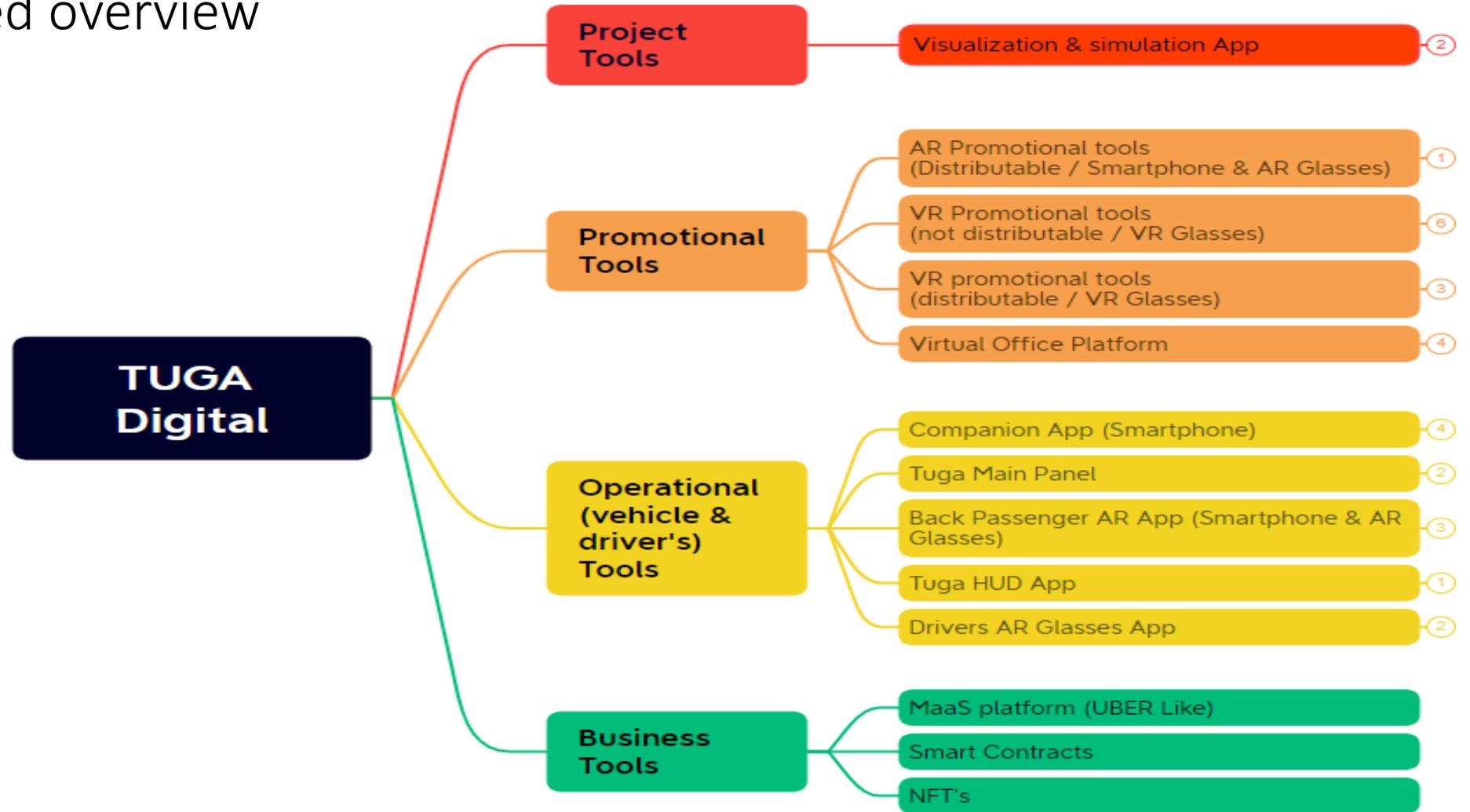
an integrated overview



A few possible platforms for the “Business Tools” have been identified and analyzed for later decision making

# TUGA DIGITAL PLATFORM

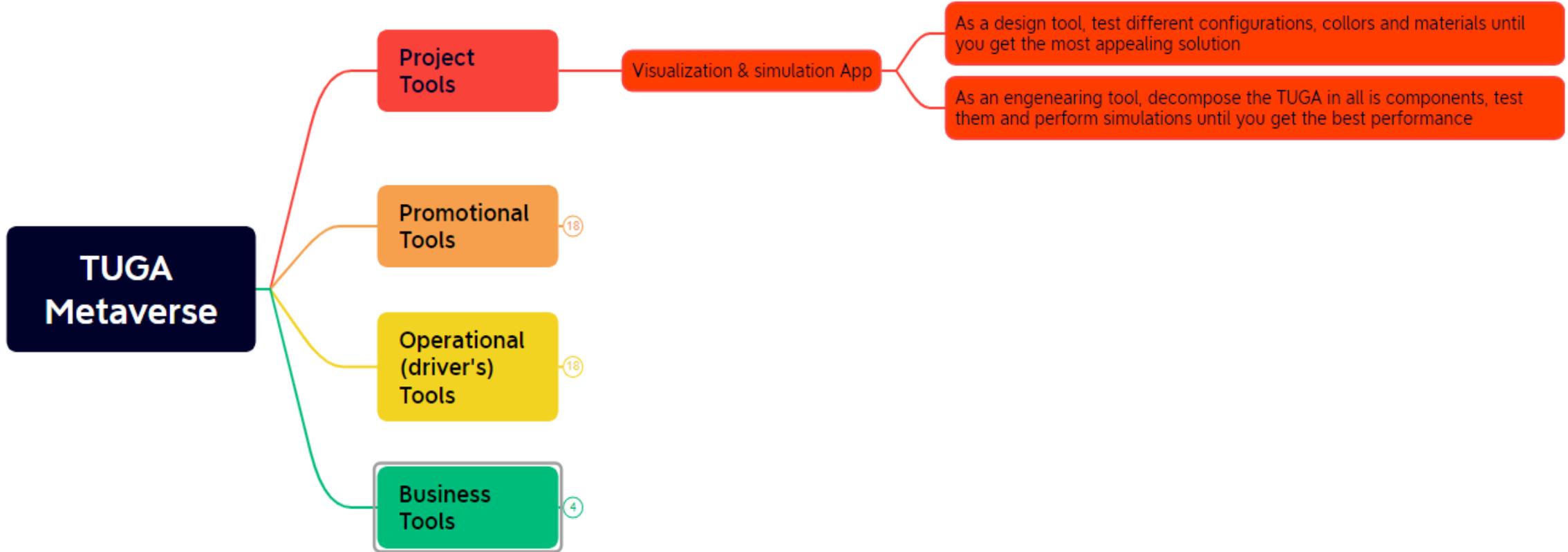
an integrated overview



These are some of the planned, concluded or in production Tools, for the main identified areas

# TUGA DIGITAL PLATFORM

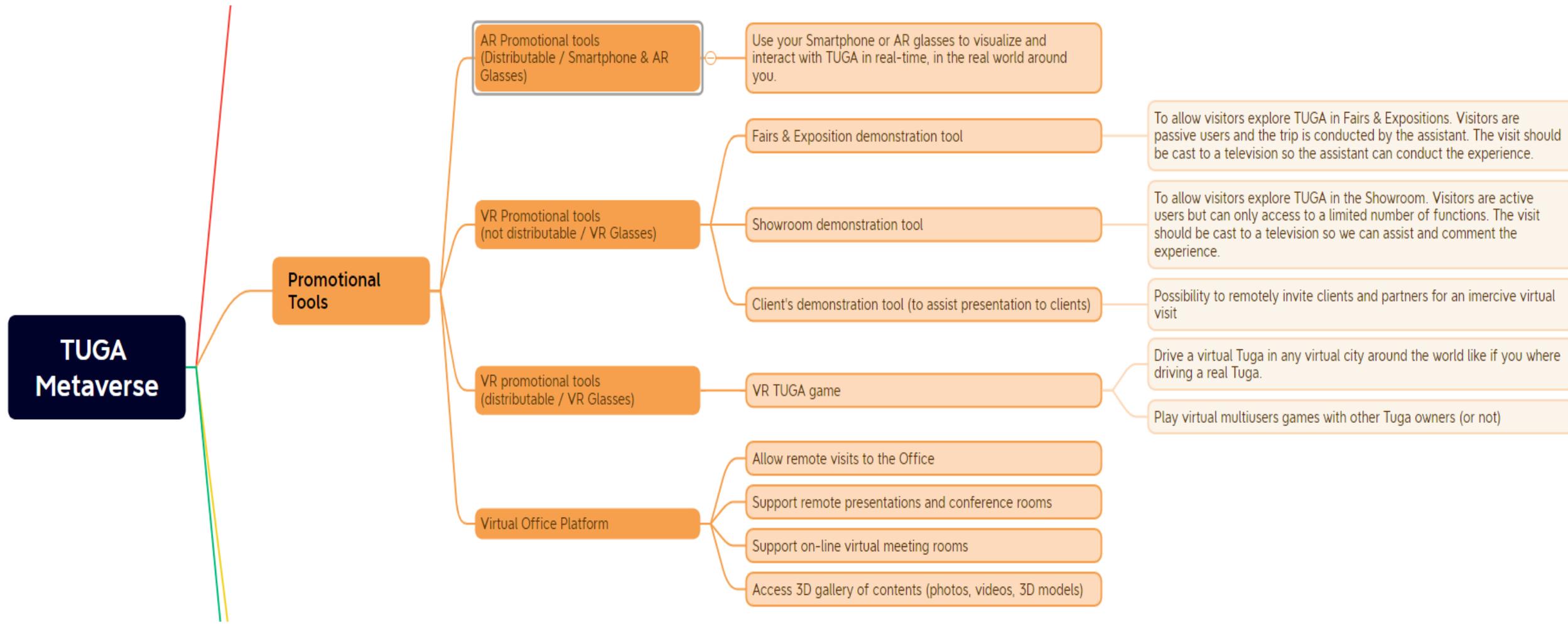
an integrated overview



These are some of the planed, concluded or in production Tools, for the main identified areas

# TUGA DIGITAL PLATFORM

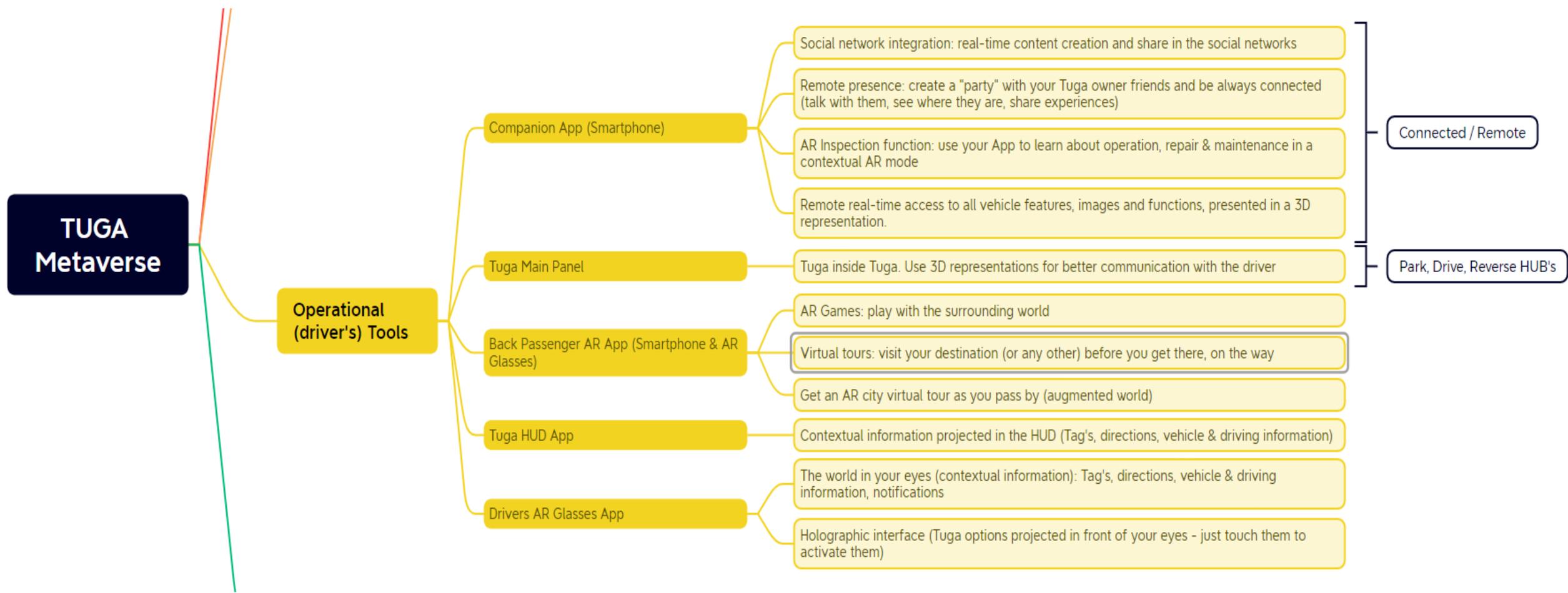
## an integrated overview



These are some of the planned, concluded or in production Tools, for the main identified areas

# TUGA DIGITAL PLATFORM

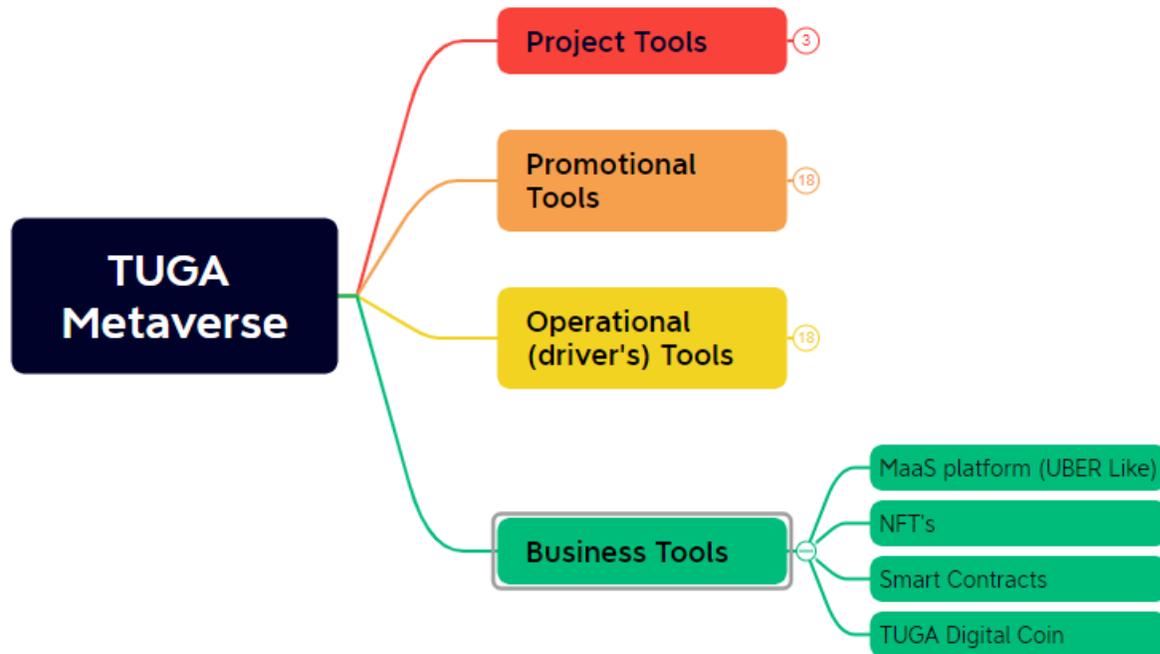
## an integrated overview



These are some of the planned, concluded or in production Tools, for the main identified areas

# TUGA DIGITAL PLATFORM

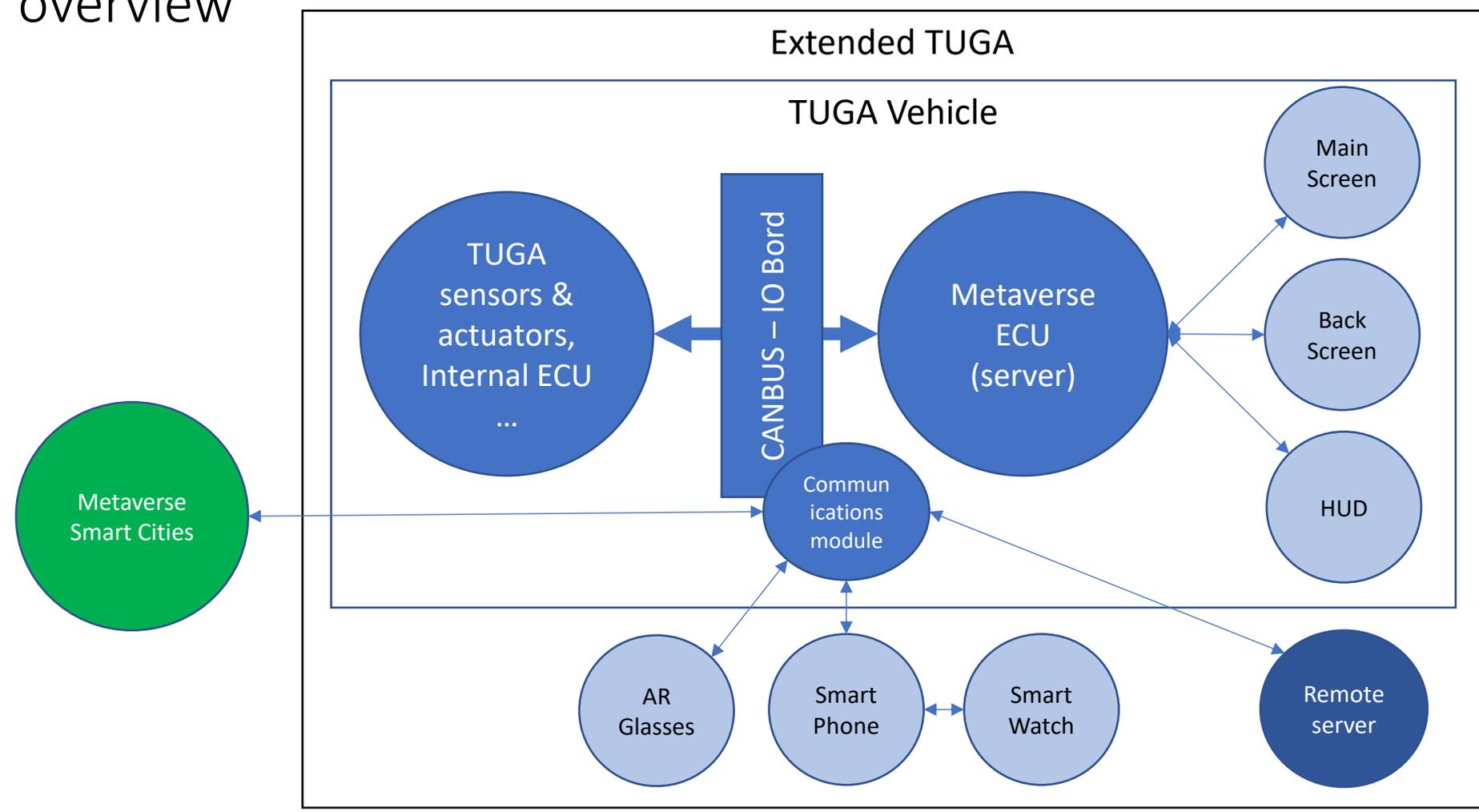
an integrated overview



These are some of the planned, concluded or in production Tools, for the main identified areas

# TUGA DIGITAL PLATFORM

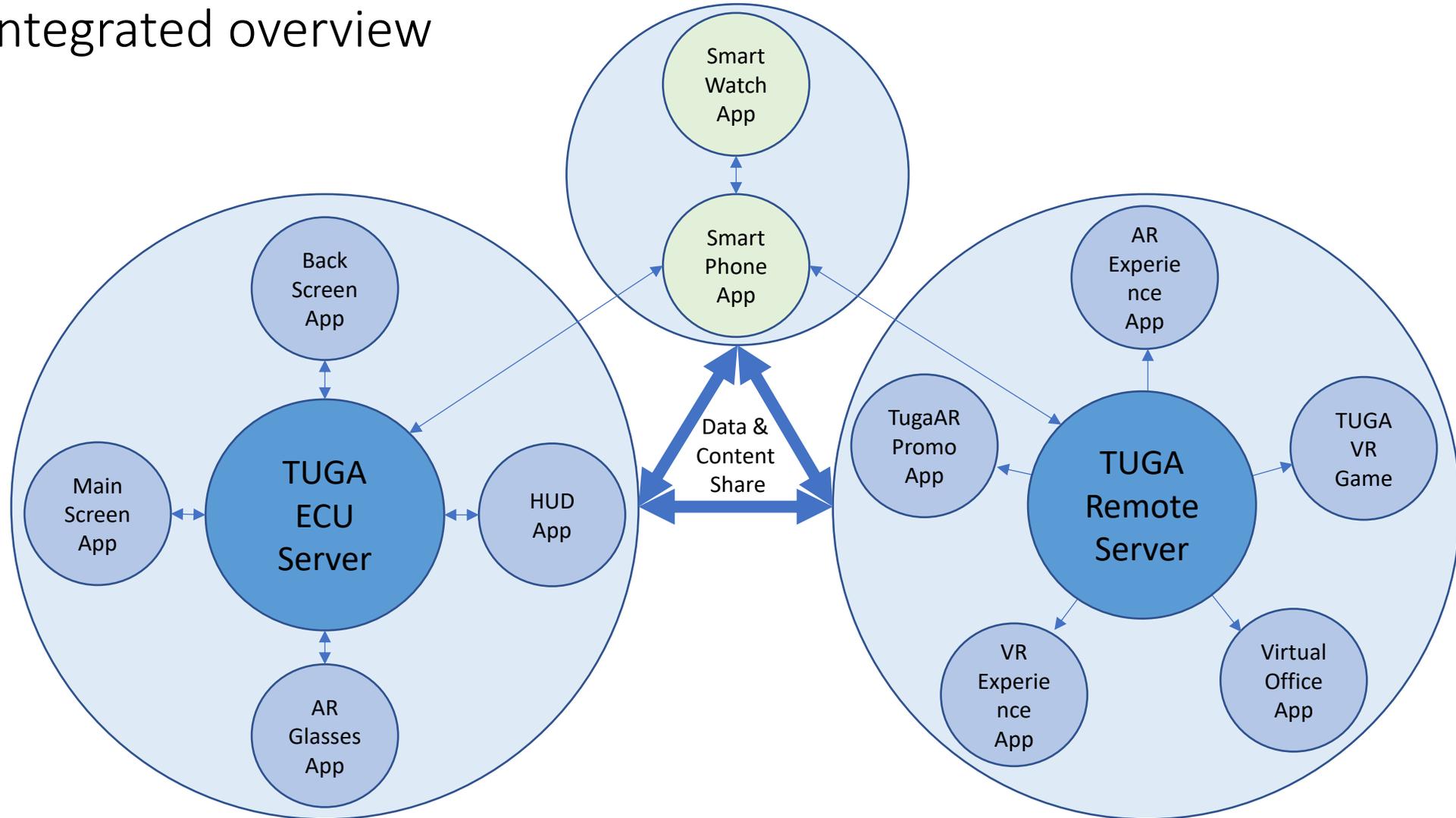
an integrated overview



All the user interactions related with the several screens attached or connected with TUGA communicates through the so called “Metaverse ECU”. The Metaverse ECU then communicates with TUGA through the CANBUS

# TUGA DIGITAL PLATFORM

an integrated overview

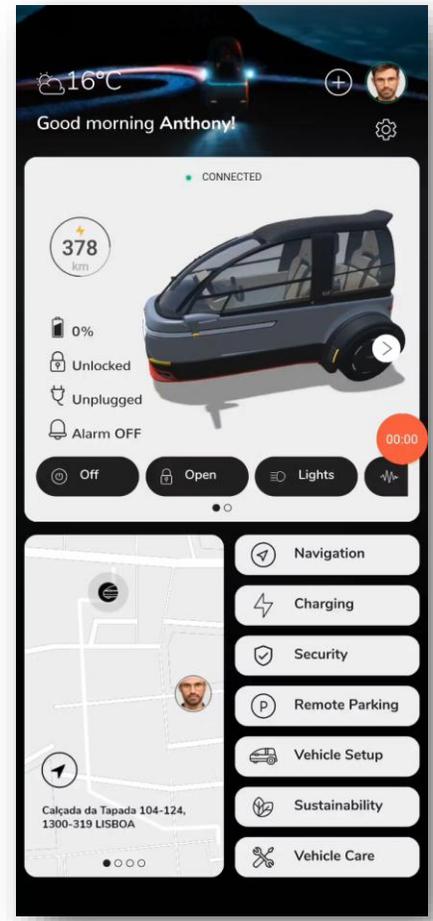


All these App's in the different spheres uses the same common platform making the data and content sharing between them easy and efficient.

# TUGA DIGITAL PLATFORM

an integrated overview

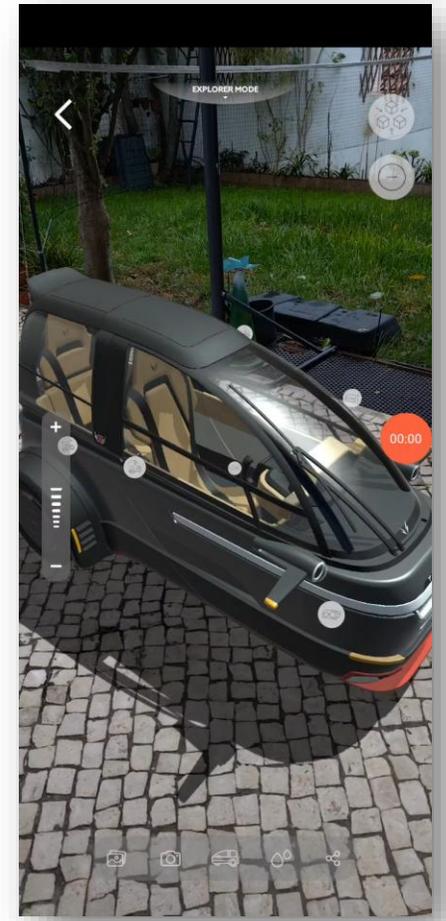
Multimedia: TUGA Companion App



Mix Reality (AR/VR): TUGA Virtual Office App



AR: TUGA AR App



Example of three different TUGA tools sharing the same content (3D model and functional simulations), in three different contexts (multimedia, augmented reality and mix reality (AR/VR))



# TUGA DIGITAL PLATFORM

## an integrated overview

### TUGA Virtual CANBUS

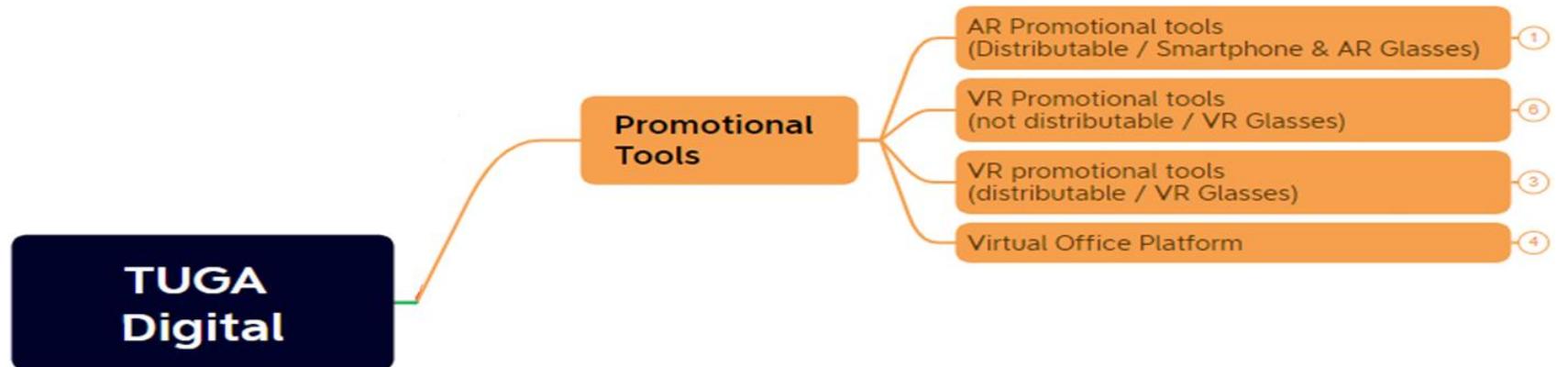
<b>Main Switch</b> CAN MainSwitch: <input type="checkbox"/>	<b>Battery</b> fBattery Connection: <input type="checkbox"/> fBattery BatteryPercentage: <input type="text" value="0"/> fBattery ChargingSpeed: <input type="text" value="0"/> fBattery ElapsedTime: <input type="text" value="0"/> fBattery EstimatedCompletion: <input type="text" value="0"/> fBattery Level: <input type="text" value="0"/> fBattery Mode: <input type="text" value="0"/> fBattery TimeRemaining: <input type="text" value="0"/>	<b>Motor Control Right</b> fMotorControlRight MainControl: <input type="text" value="0"/> fMotorControlRight Acceleration: <input type="text" value="0"/> fMotorControlRight MotorSensor: <input type="text" value="0"/> fMotorControlRight RollOver: <input type="text" value="0"/> fMotorControlRight Speed: <input type="text" value="0"/> fMotorControlRight Tilt: <input type="text" value="0"/>	<b>Drive</b> fDrive AirBag: <input type="checkbox"/> fDrive ABS: <input type="text" value="0"/> fDrive CruiseControl: <input type="text" value="0"/> fDrive TorqueVectoringOnRearWheels: <input type="text" value="0"/> fDrive TractionControl: <input type="text" value="0"/> fDrive Mode: <input type="text" value="0"/>	<b>UDC</b> fUDC FrontDistance: <input checked="" type="checkbox"/> fUDC FrontLeftDistance: <input type="text" value="0"/> fUDC FrontRightDistance: <input type="text" value="0"/> fUDC RearDistance: <input type="text" value="0"/> fUDC RearLeftDistance: <input type="text" value="0"/> fUDC RearRightDistance: <input type="text" value="0"/>
<b>Hvac</b> fHVAC Ac: <input type="checkbox"/> fHVAC Heater: <input type="checkbox"/> fHVACSeatHeating: <input type="checkbox"/> fHVAC Van: <input type="checkbox"/>	<b>Motor Control Front</b> fMotorControlFront MainControl: <input type="text" value="0"/> fMotorControlFront Acceleration: <input type="text" value="0"/> fMotorControlFront MotorSensor: <input type="text" value="0"/> fMotorControlFront RollOver: <input type="text" value="0"/> fMotorControlFront Speed: <input type="text" value="0"/> fMotorControlFront Tilt: <input type="text" value="0"/>	<b>Environmental</b> fEnvironmental AirQuality: <input type="text" value="0"/> fEnvironmental CO2: <input type="text" value="0"/> fEnvironmental Humidity: <input type="text" value="0"/> fEnvironmental InsideTemperature: <input type="text" value="0"/> fEnvironmental Light: <input type="text" value="0"/> fEnvironmental OutsideTemperature: <input type="text" value="0"/> fEnvironmental Rain: <input type="text" value="0"/> fEnvironmental Noise: <input type="text" value="0"/>	<b>Lights</b> fLights DaytimeRunningLight: <input type="checkbox"/> fLights DirectionIndicatorLeft: <input type="checkbox"/> fLights DirectionIndicatorRight: <input type="checkbox"/> fLights DrivingBeamFrontLight: <input type="checkbox"/> fLights DrivingHiBeamFrontLight: <input type="checkbox"/> fLights FrontFogLight: <input type="checkbox"/> fLights HazardWarningLamp: <input type="checkbox"/> fLights InteriorLightBack: <input type="checkbox"/> fLights InteriorLightFront: <input type="checkbox"/> fLights RearFogLight: <input type="checkbox"/> fLights RearPositionLight: <input type="checkbox"/> fLights RearRegistrationPlateLight: <input type="checkbox"/> fLights ReversingLight: <input type="checkbox"/> fLights StopLight: <input type="checkbox"/>	<b>security</b> CAN Sensor1: <input type="checkbox"/> CAN SensorN: <input type="checkbox"/> CAN Alarm: <input type="checkbox"/>
<b>Axle</b> CAN RearAxel: <input type="checkbox"/>	<b>Motor Control Left</b> fMotorControlLeft MainControl: <input type="text" value="0"/> fMotorControlLeft Acceleration: <input type="text" value="0"/> fMotorControlLeft MotorSensor: <input type="text" value="0"/> fMotorControlLeft RollOver: <input type="text" value="0"/> fMotorControlLeft Speed: <input type="text" value="0"/> fMotorControlLeft Tilt: <input type="text" value="0"/>	<b>Body</b> fBody SeatBeltLockFront: <input type="checkbox"/> fBody SeatBeltLockRear: <input type="checkbox"/> fBody SeatOccupancyFront: <input type="checkbox"/> fBody SeatOccupancyRear: <input type="checkbox"/> fBody UltrasoundDistanceControl: <input type="checkbox"/> fBody SeatExpand: <input type="checkbox"/>	<b>Horn</b> CAN Horn: <input type="checkbox"/>	
<b>Front Door</b> fFrontDoor Open: <input type="checkbox"/> fFrontDoor Lock: <input type="checkbox"/> fFrontDoor Slide: <input type="checkbox"/>				
<b>Rear Door</b> fRearDoor Lock: <input type="checkbox"/> fRearDoor Slide: <input type="checkbox"/>				
<b>Steering</b> fSteering Electrical: <input type="text" value="0"/> fSteering Angle: <input type="text" value="0"/> fSteering GearShift: <input type="text" value="0"/> fSteering Rotation: <input type="text" value="0"/> fSteering Torque: <input type="text" value="0"/>				

While the physical vehicle is not available, a virtual CANBUS interface was implemented to simulate all the interactions between the physical and the digital world. Once the physical TUGA elements are ready, the virtual CANBUS will be replaced by the real one and all the virtual tools will be feed by real data instead of simulated one.

# TUGA DIGITAL PLATFORM

an integrated overview

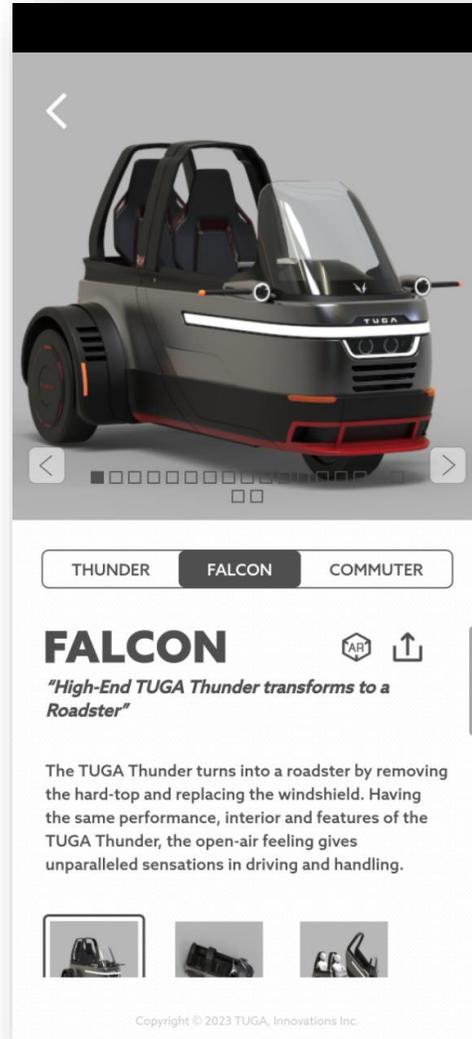
## Promotional Tools



# TUGA DIGITAL PLATFORM

an integrated overview

TUGA AR App



# TUGA DIGITAL PLATFORM

an integrated overview

TUGA AR App variations  
(TUGA on Air)



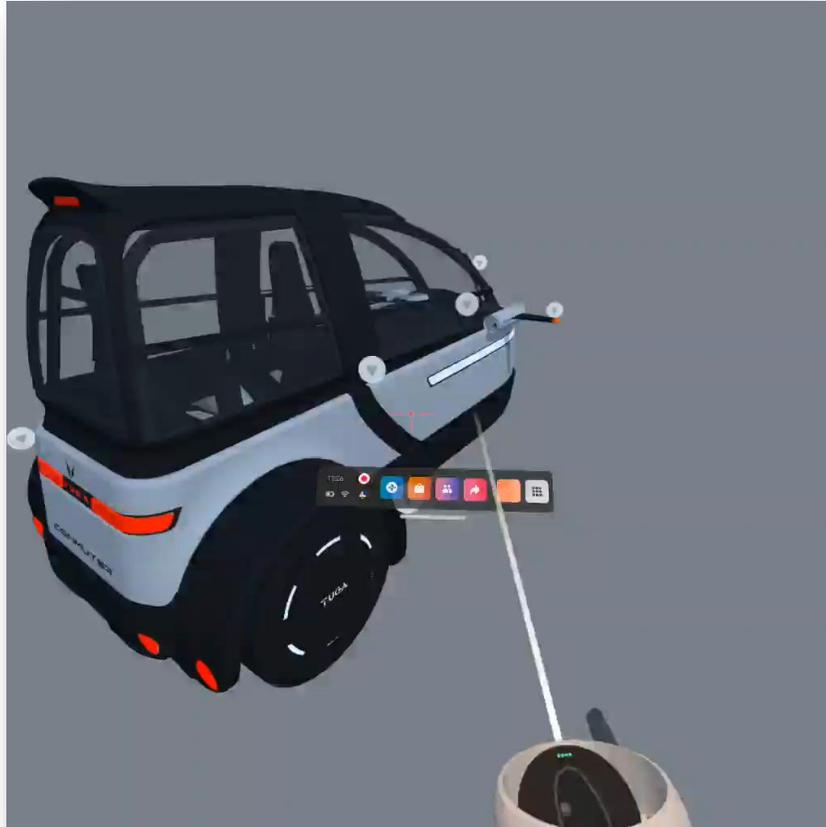
TUGA AR App variations  
(Virtual Office Portal)



# TUGA DIGITAL PLATFORM

an integrated overview

TUGA VR App  
(Explore mode)



... then the TUGA was placed inside a city

# TUGA DIGITAL PLATFORM

an integrated overview

TUGA VR App  
(simulations)



Once inside the city, it was possible to create simulations showing some of TUGA abilities (parking in narrow spaces, filtering, ...)

# TUGA DIGITAL PLATFORM

an integrated overview

TUGA VR App  
(Guide mode)



Finally, for those who are not comfortable with the VR environment, a “Guide mode” tour was create to allow users experiment the feeling of being inside the TUGA and explore some of his functionalities.

# TUGA DIGITAL PLATFORM

an integrated overview

- Improve surround environment & simulation quality
- Refine User interfaces & Interaction mode
- Support multi-user
- Extend multi-user possibility to remote access
- Export the immersive experience to AR
- Implement the “Drive TUGA” mode inside the city (game approach)

TUGA VR App  
(Planned Evolutions)

# TUGA DIGITAL PLATFORM

an integrated overview

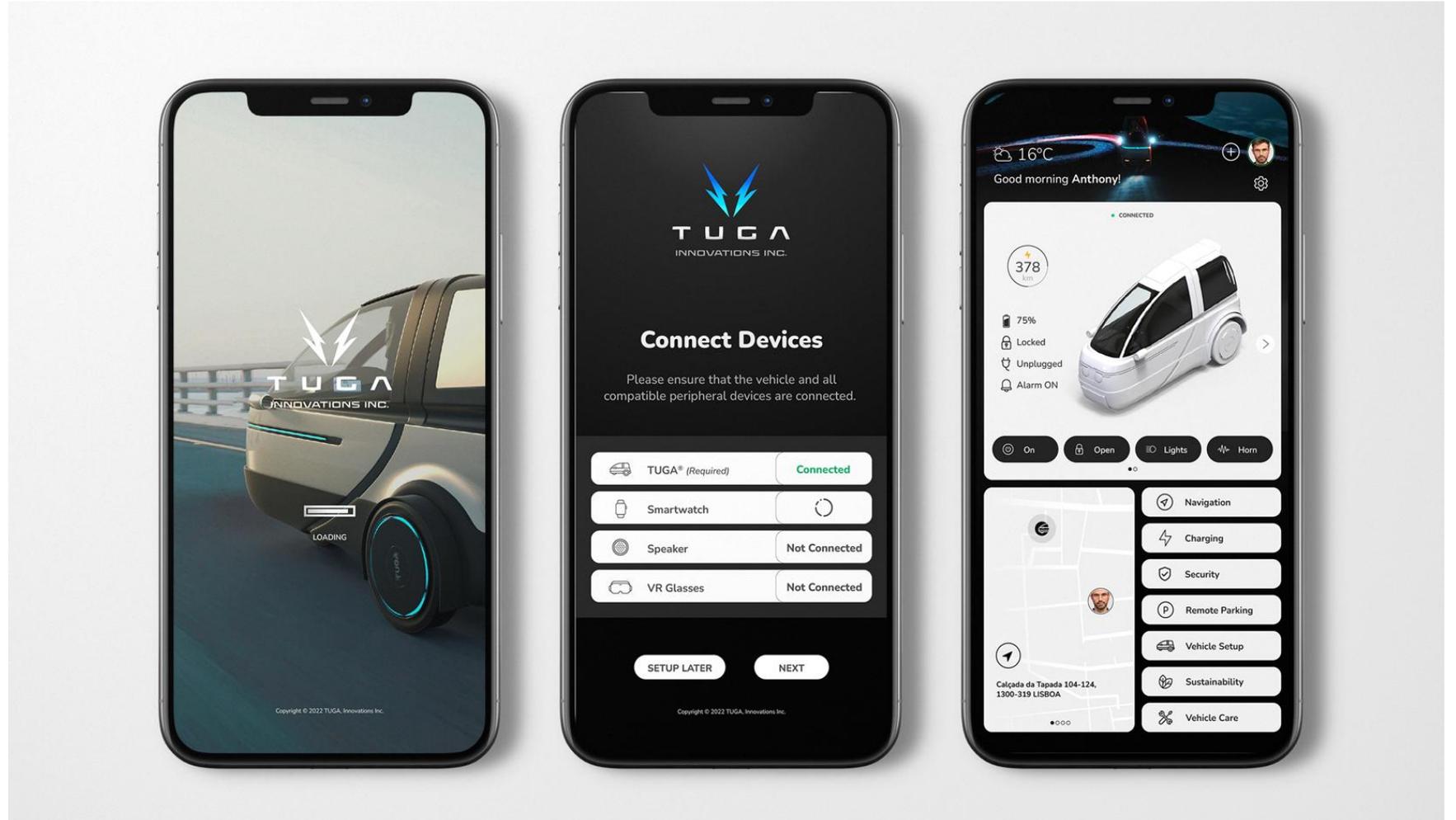
## Operational Tools



# TUGA DIGITAL PLATFORM

an integrated overview

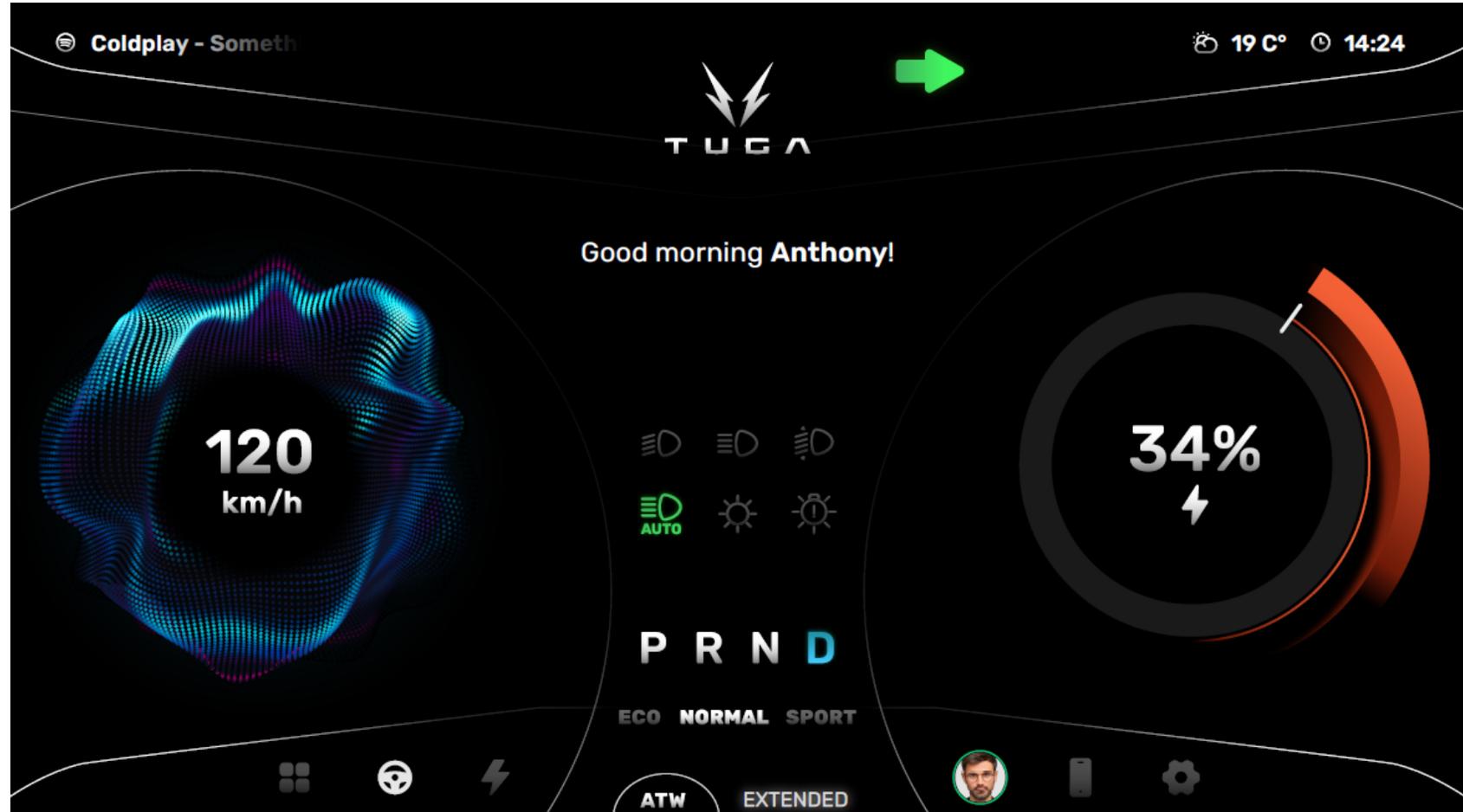
TUGA  
Companion App  
(Connected, Disconnected)



# TUGA DIGITAL PLATFORM

an integrated overview

TUGA  
Main Screen  
(Drive, Park, Reverse Hub)

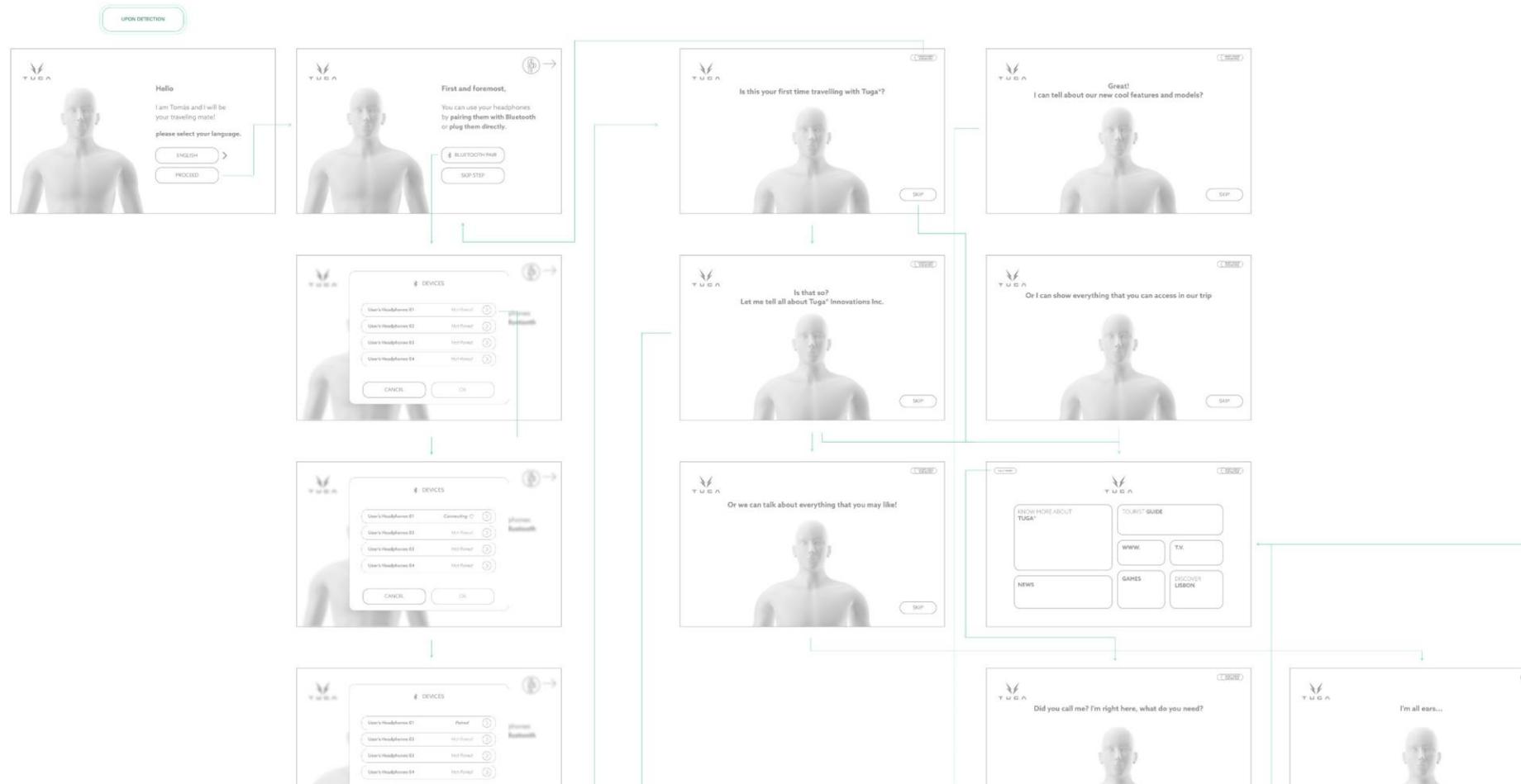


# TUGA DIGITAL PLATFORM

an integrated overview



TUGA  
Back Screen



# TUGA DIGITAL PLATFORM

an integrated overview

TUGA  
HUD



Thanks