

Future Architecture of Vehicle Cockpit Displays with Multiple Inter-Operating Systems

GENIVI All-Member Meeting – May 15, 2019

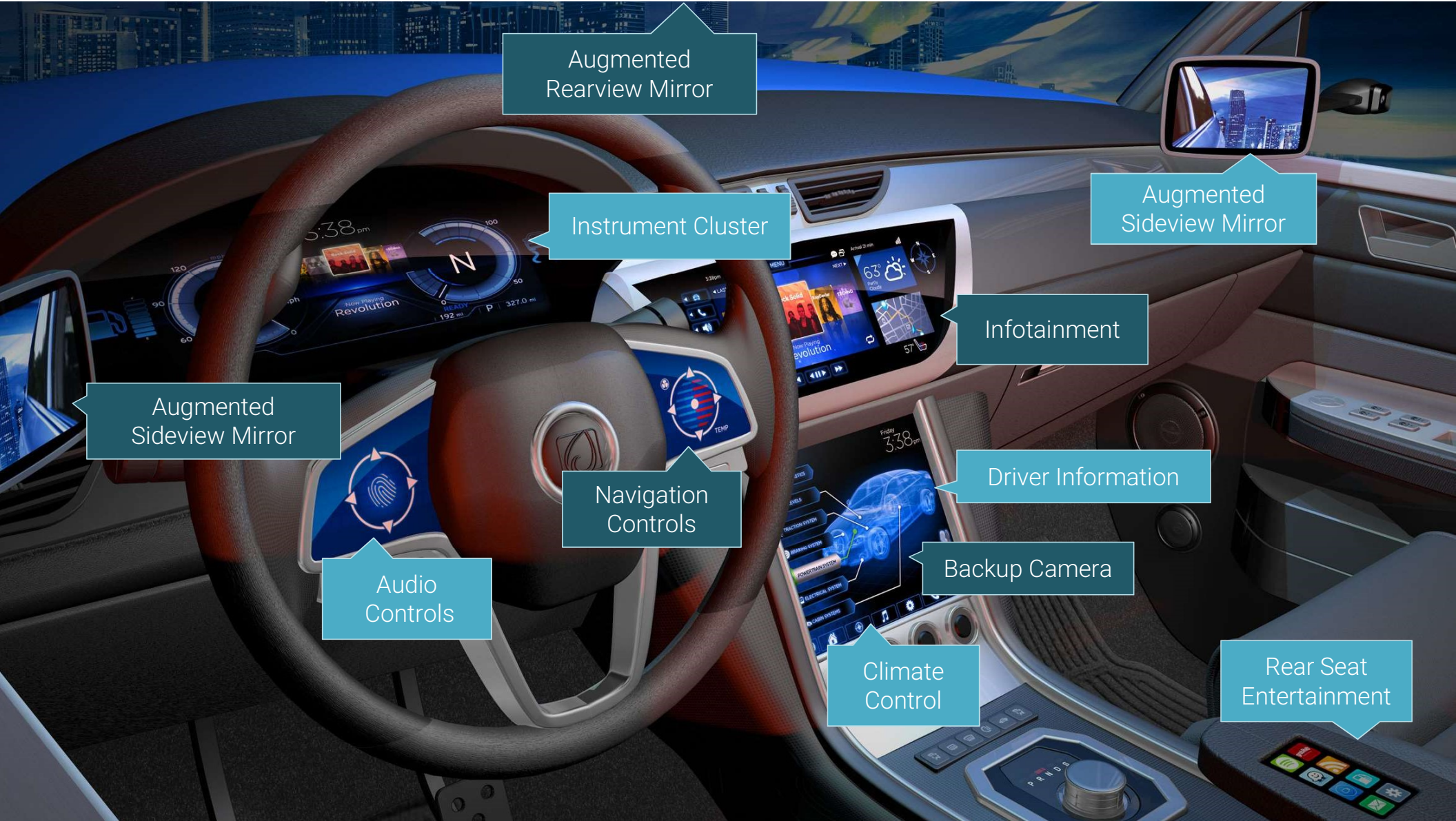


Jeff Stewart

Global Director, Field Application Engineering

Displays are transforming the
automotive cockpit.





Augmented Rearview Mirror

Augmented Sideview Mirror

Instrument Cluster

Infotainment

Augmented Sideview Mirror

Navigation Controls

Driver Information

Audio Controls

Backup Camera

Climate Control

Rear Seat Entertainment

Augmented Reality Head-Up Display



MP/h
65

126ft

NE
354
MILES TO
DESTINATION

73°
OUTSIDE
68°
INSIDE

MP/h
65
RANGE
360m

RPM
5
RANGE
360m

Projection Headlights



Augmented Reality Rear
Seat Windows

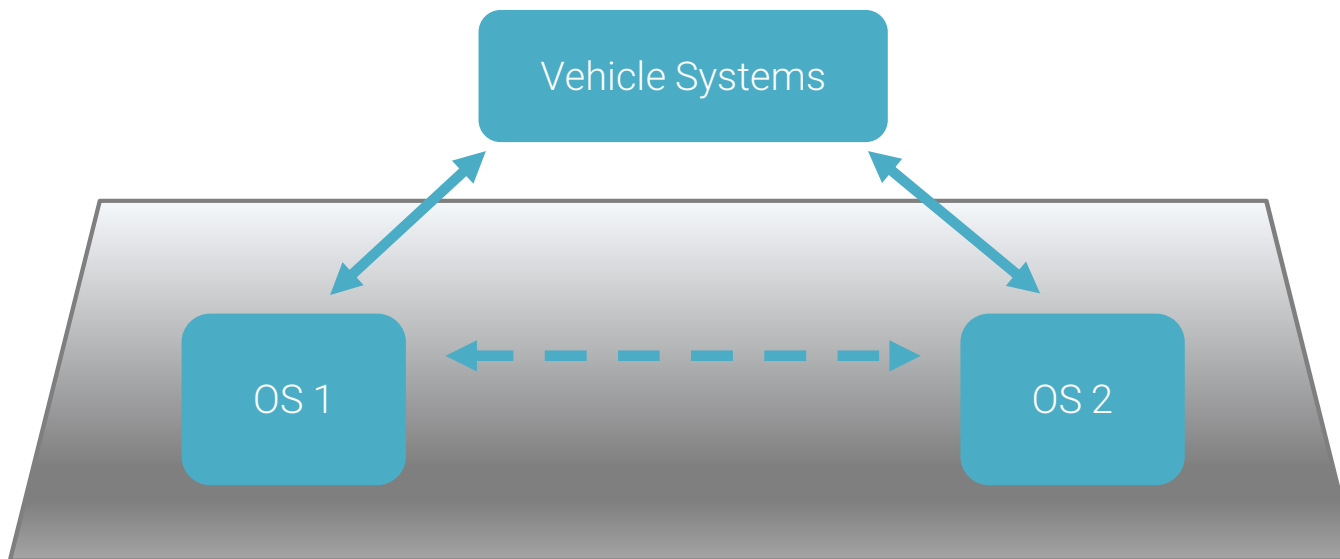




User Apps



Common data needs require these systems **and operating systems (OSs)** to work together.



- Hardware changes as requirements change (multiple ECUs and inter-ECU communication)

Industry shift

Yesterday

- One display per ECU
 - Cluster (MCU)
 - CID/Radio/Navigation (SoC)
- Very little content exchanged
- Purpose-built devices



Today

- Single SoC (domain controller) driving multiple displays
- Massive sharing of content
- Configurable devices

Challenges Arising from this Trend



Content sharing

- EX: Video stream from navigation system to cluster/additional display

Third party content

- Apps
- Contacts
- Media lists

Cyber security

Safety

- Mixture of non-safety and safety relevant content in one display
- Driver distraction because of information overflow

Multiple OS Requirements



Hardened OS

- Safety applications directly communicating with vehicle data

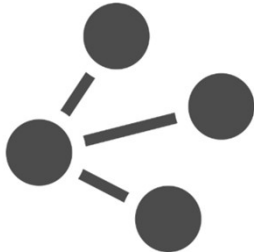
No OS (or very thin OS)

- Small accessory items (headlights, mirrors, HVAC)

Commercial/Connected OS

- Infotainment (Android/Apple)

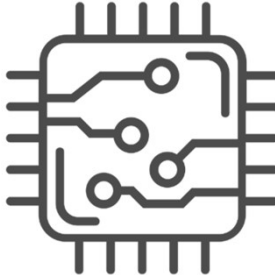
Multi-OS Architectures for Display Systems



Software Solution



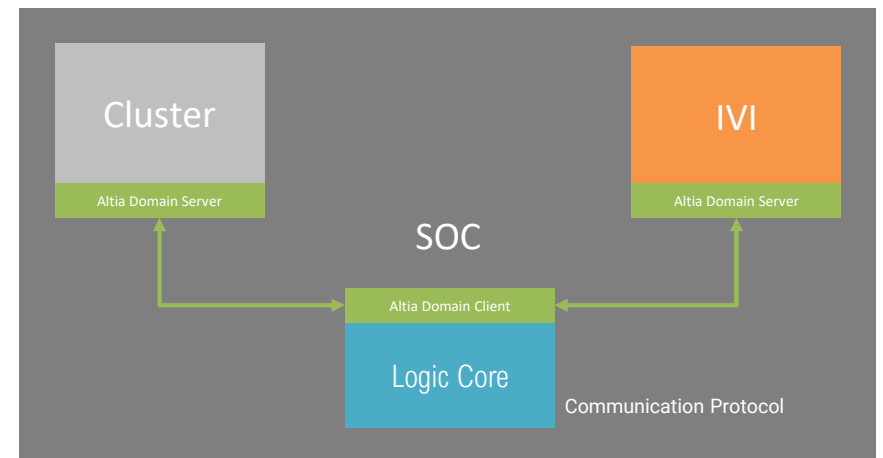
Virtualization



Hardware Resource Allocation

Flexible communication in integrated cockpit solution using Altia Domain

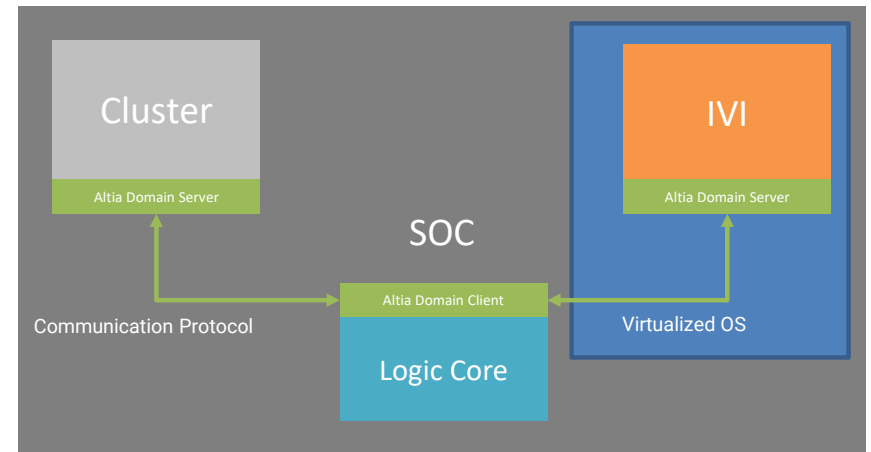
- Advantages:
 - Can use any communication protocol.
 - Number of processes and data structure can vary.
 - Systems only receive data they need.
 - Can allow for systems to be distributed.



Flexible communication in integrated cockpit solution using Altia Domain

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 - Can use any communication protocol.
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 - Systems only receive data they need.
 - Can allow for systems to be distributed.

Altia Domain works the same with or without hypervisors.

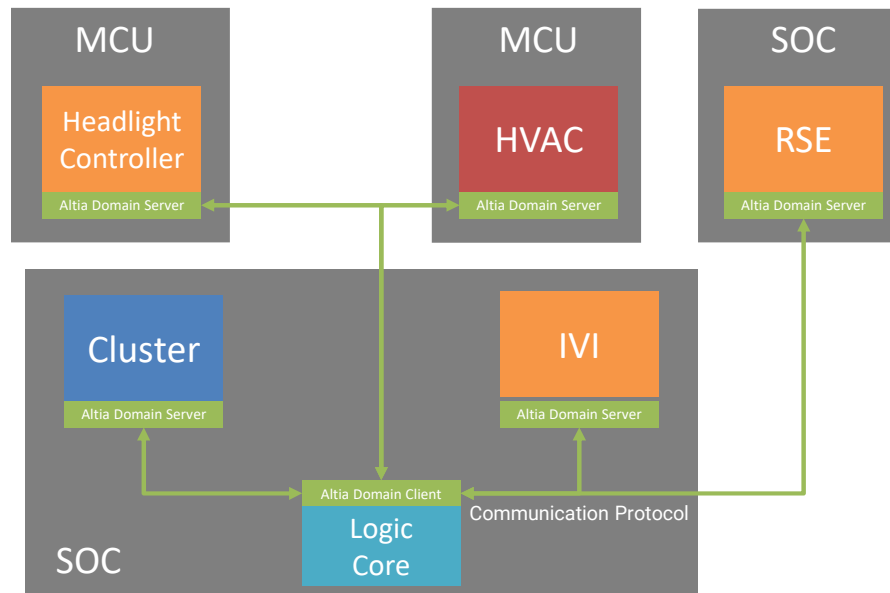


One, Common Software Solution



Altia Domain can communicate on a single SoC or across multiple devices over any protocol including the GENIVI generic communication protocols.

- Build your code once, deploy to different HW scenarios based on cost targets as appropriate.

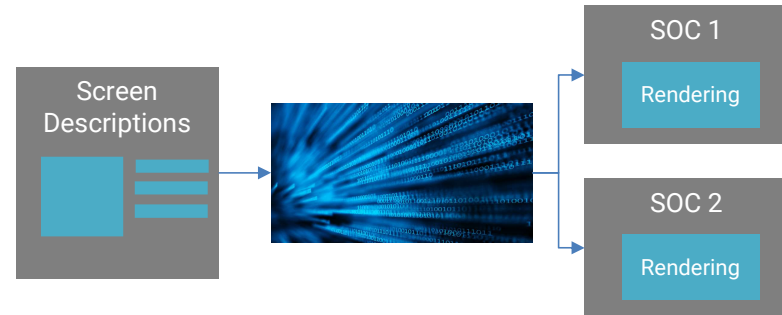


Altia eCockpit Showcase at CES 2019

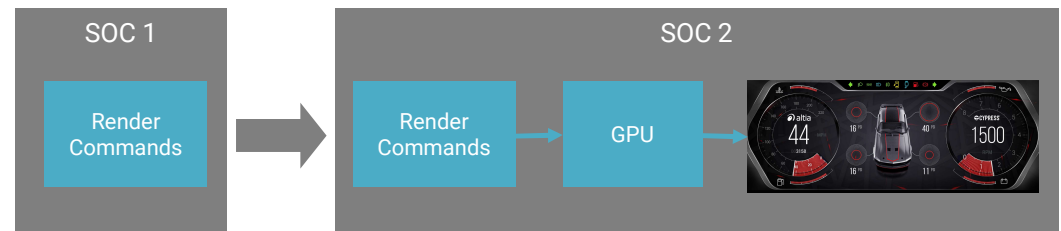


Graphics Content Sharing

Graphics Sharing Solutions



Shared Screen Descriptions (Remote HMI)



"Remote" (API Remoting) Rendering (ex. Ramses)

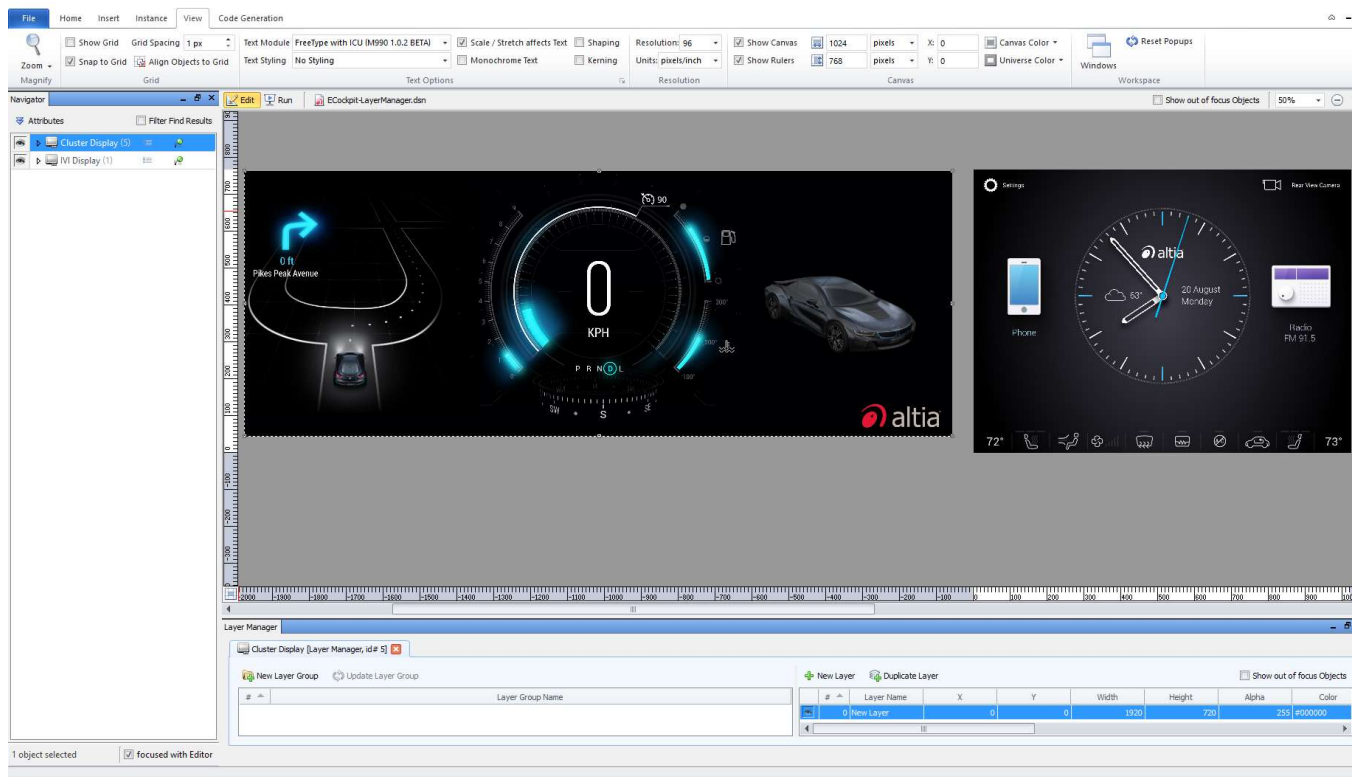


Video Stream (Rendering Completed)

Altia Layer Manager



Control multiple displays in a single modeling environment



Easily control your hardware

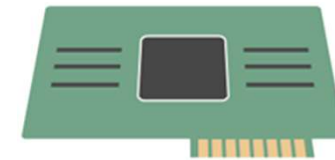
- Deep integration with HW features controlled directly from design environment.
- Layer manager enables you to:



Output to Multiple Displays



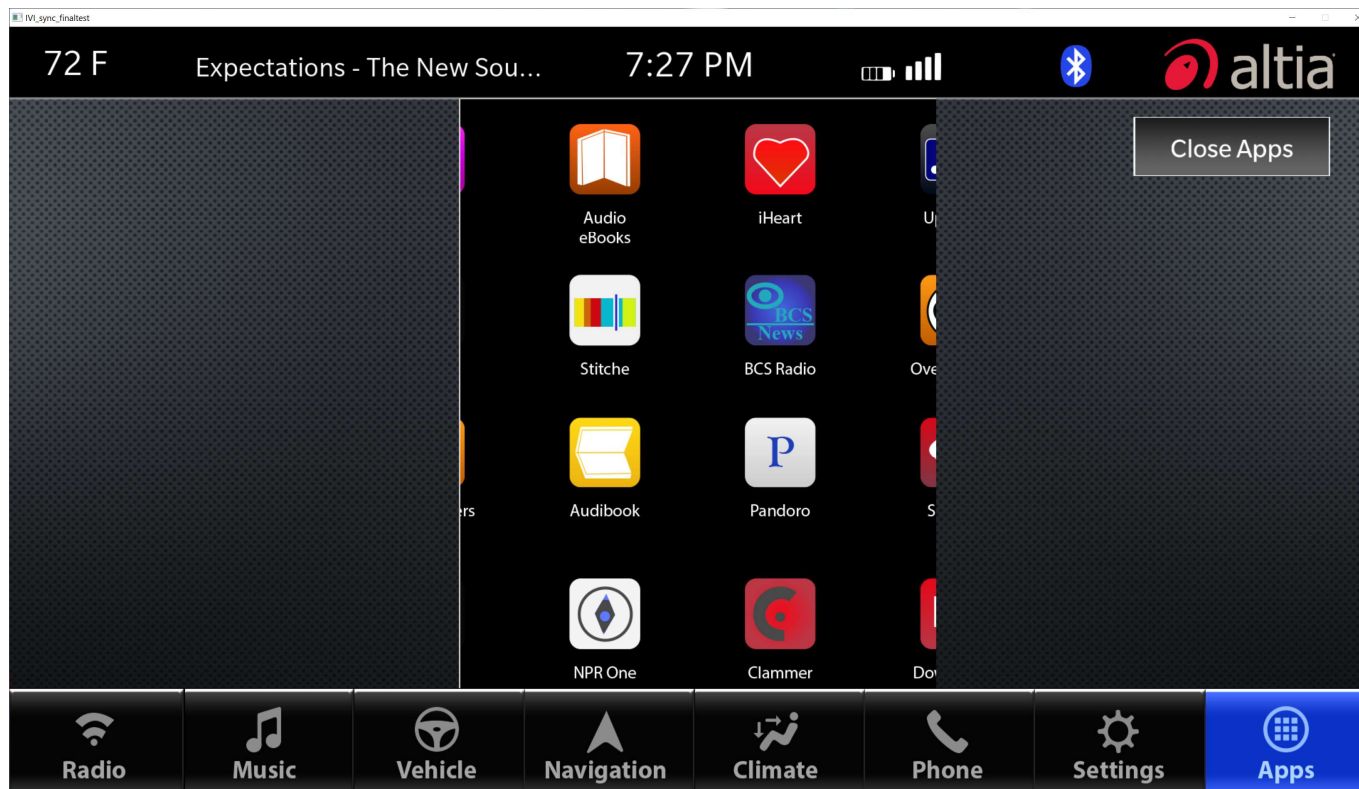
Video Layers



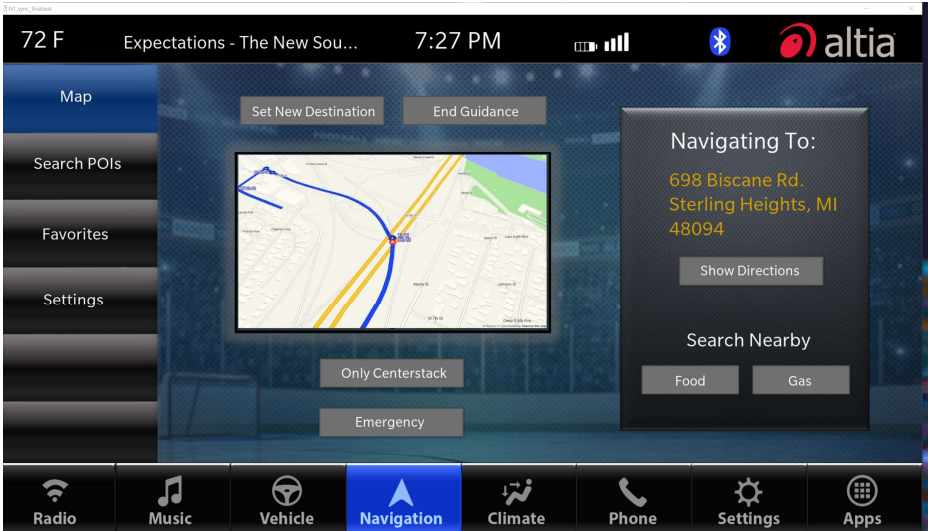
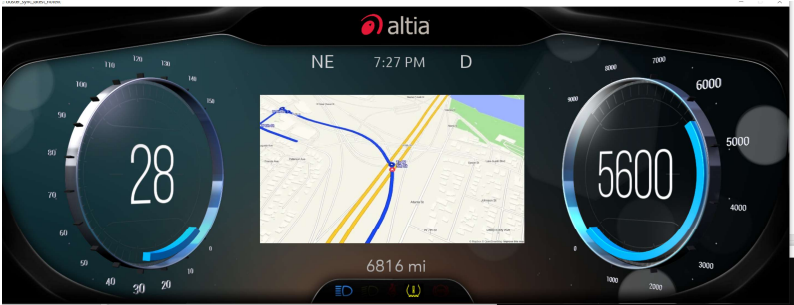
HW Safety features

3rd Party Content

Full control of your display real estate



Content Sharing Concept Demo





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