Rapidly build fluid, contextual and relevant automotive HMI

Increasing demand for safety, personalized driving experiences, convenience delivered by numerous technologies and ubiquitous connectivity are driving the movement towards converting connected vehicles into high-performing, intricate machines built on very complex logic. An exponential increase in options and complexity and changing automotive ecosystem parameters, expand drivers’ human-machine experiences. In order to respond these challenges, automotive HMIs need to be much more fluid, contextual and relevant to consumers. Also, there is a need to support new use cases and to accommodate technological advances with quick turn-around.

HARMAN Connected Services (HCS) supports OEMs and Tier-1 suppliers in developing HMI for automotive head-units, including the IVI HMI, cluster HMI and other displays. HCS also supports the development of the UI views, data models and application’s business logic. The HMI can be developed based on the UI/UX design either from the OEM, Tier-1 Supplier or from HARMAN. HCS can accommodate the full responsibility of total software stack development, including requirements management, system architecture, HMI design and development, middleware services development and integration, hardware integration and BSP, system integration and verification, etc.

HCS is equipped with the HARMAN Automotive UI Development suite (HCAT), a complete product (SDK) that allows rapid development of enhanced and highly customizable HMI. The services HCS offers to support Automotive HMI development includes but is not limited to:

- Rapid HMI prototyping
- Complete HMI development for infotainment and/or instrument cluster system
- Separate HMI applications/HMI web services development
- HMI customization/branding
- Creation of custom UI elements and element libraries
- Complex 3D scenes development
- Screen graphics optimizations on target
- KPI optimizations (boot-up, performance) on target
- Multiscreen HMI solutions with seamless user interactions
- HMI functional and non-functional verification activities

Top-line Benefits

- Accelerated HMI deployment coupled with cost and royalty savings
- Successful HMI deployments done for large OEMs across the world
- Competence/development centers in Russia, China and India accommodating volatile requirements and aggressive schedules

Center of competencies

- OPERATING SYSTEMS: Windows, Linux (AGL, GENIVI, etc), MeeGo/Tizen, RTOS (QNX, Integrity), Android N/car/O
- TECHNOLOGIES: C/C++, Qt /QML, Java EE, HTM5/JS, Open GL
- MAIN TOOLS/COMPONENTS: Qt Framework / QML, Qt 3D Studio, HCAT Framework and Toolkit, EB Guide Studio, Kanzi Studio
- Standards: Safety ISO 26262 (ASIL), GENIVI/AGL compliance
- Hardware: X86 (simulation), Automotive Grade HW (Nvidia Drive CX, iMX.5/.6, Renesas R-Car), Embedded SoC (MTK, Qualcomm, Exynos)
- BSP/drivers and Services level expertise
- HMI and User Interface design and development
- Web Services, SDK Creation, Custom UI Elements
- Internet and satellite radio services
- Navigation systems (various navigation engines and map formats)

www.harman.com
©2018 HARMAN INTERNATIONAL INDUSTRIES, INCORPORATED
This document is for informational purposes only. All rights reserved.
## Capabilities and Benefits

### Verification & validation

- Verification & validation strategies for unit testing, functional testing, integration testing and system testing
- Definition of local test routes and conditions, planning of test campaigns
- Creation of test cases and scenarios
- Test execution in test laboratory with system tests
- Field test of the new software and hardware releases
- Head unit maintenance and update with latest SW and map data

### HARMAN Automotive UI development suite (HCAT)

HCAT stands for HMI Cross-platform Application Toolchain. It allows HMI hardware to be independent and extends well beyond traditional architecture. This HMI cross-platform application toolchain enables multi-screen support, automates development process and helps in creating HMI application like separate modules.

- Major benefits delivered by this toolchain are as follows:
  - HW Independent HMI
  - Multi-screen support
  - UI Server architecture
  - Development process
  - Modules architecture
- Dedicated team of experts at HARMAN to maintain and enhance this product

### Digital cockpit development

- Development of the full software stack for OEM Digital cockpit
- IVI Platform customization and extension with new product specific features
- Digital Cluster and HUD development
- Full Software and System integration responsibilities
- Multiple operating systems running on top of hypervisor technologies
- Fast prototyping and new HMI system development with the help of HARMAN HCAT framework
  - Multi-brand support
  - Original HMI design of Cluster, HUD, Main and Passenger displays
  - 2D/3D animation
- Feature and system level testing
- Performance optimization

## Partner with an industry expert

HARMAN (harman.com) designs and engineers connected products and solutions for automakers, consumers, and enterprises worldwide, including connected car systems, audio and visual products, enterprise automation solutions; and services supporting the Internet of Things. With leading brands including AKG®, Harman Kardon®, Infinity®, JBL®, Lexicon®, Mark Levinson® and Revel®, HARMAN is admired by audiophiles, musicians and the entertainment venues where they perform around the world. More than 50 million automobiles on the road today are equipped with HARMAN audio and connected car systems. Our software services power billions of mobile devices and systems that are connected, integrated and secure across all platforms, from work and home to car and mobile. HARMAN has a workforce of approximately 30,000 people across the Americas, Europe, and Asia. In March 2017, HARMAN became a wholly-owned subsidiary of Samsung Electronics Co., Ltd.

Visit our website at harmanconnected.services/HMI-development-services