Technical Article

Development Platforms Pave the Way to Production Systems for ADAS

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Developing a production advanced driver assistance system (ADAS) requires working in both controlled laboratory environments and real-world scenarios. Development platforms from TI's ecosystem design partners can help.

Focused on specific ADAS applications, these development platforms offer a more advanced starting point for engineering development relative to a typical evaluation module (EVM). They provide hardware and firmware around the system on chip (SoC) to enable data acquisition for sensor evaluation and characterization. They can also provide a scalable approach from a laboratory development to an on-vehicle deployment.

Starter Kits

In a laboratory environment, a starter kit enables algorithm development and tuning under controlled conditions. The Jacinto™ TDA3x Automotive Starter Kit has up to four synchronous FPD-Link™ III high-definition data streams. It includes TI software development kits (SDKs) and D3 Engineering software frameworks with demonstration-level algorithms for front or rear camera applications, 2-D/3-D surround view, driver monitoring, and radar fusion.

With the starter kit, shown in Figure 1, you can simulate challenging scenes such as high contrast or light-emitting diode (LED) flicker; characterize your sensors; and develop algorithms for motion compensation, gain, auto-exposure, auto-focus, and auto-white balance.

Figure 1. The TDA3x Automotive Starter Kit Helps Simulate Challenging Scenes to Enable Algorithm Development and Turning under Controlled Circumstances

Rugged Vision Platform (RVP) Development Kits

During the next phase of development, you need a more rugged platform for proof-of-concept testing in real-world conditions. RVP development kits, with the same SDK and software frameworks as the starter kits, ease the transition from lab to on-vehicle testing.

TDA3x processors have image signal processors (ISPs) built into the chip and direct MIPI Camera Serial Interface (CSI)-2 access to camera data, so you can use low-power, less expensive cameras. The RVP-TDA3x Development Kit, shown in Figure 2, has a TDA3x processor and four FPD-Link III camera inputs. You can pair it with OV10640 rugged camera modules, as shown in this SurroundView demonstration video, or work with D3 Engineering to integrate other sensors.

Figure 2. RVP-TDA3x Development Kit

TDA2x integrated circuits have more processing power for your algorithms, but no internal ISPs. The RVP-TDA2x Development Kit has a TDA2x processor and eight FPD-Link III inputs. You can pair it with FPD-Link III cameras that have internal ISPs.

The new TDA2Plus processors give you the best of both worlds, with the processing power of the TDA2x family plus the on-chip ISP and direct MIPI CSI-2 access of the TDA3x family. An RVP-TDA2P Development Kit will be available in the first quarter of 2018, with up to 12 synchronous FPD-Link III sensor inputs for cameras and radar, as well as the ability to bring in GPS, LIDAR, ultrasonic and other sensors via Ethernet serial protocols.

These production-intent development kits are easy to set up, provide a logical pathway from lab bench to on-vehicle testing, and pave the way to creation of production systems. They include demo algorithms for many ADAS applications, including:

- Front camera systems to detect objects for forward collision warning, detect traffic signs and signals for navigation, and detect lane markers for lane-keeping assist.
- Backup cameras to assist drivers while reversing, detect objects for reverse collision warning and provide automatic positioning for trailer hitch hookups.
- Surround view to provide driver assistance in low-speed and parking situations and develop automatic parking applications, shown in Figure 3.
- Electronic mirrors to replace side mirrors, thus reducing drag and improving blind-spot coverage.
- Blind spot and lane-departure cameras to warn of objects in blind spots, warn of vehicles approaching or overtaking, and detect lane markers for lane-keeping assist.
- Driver monitoring to warn of a sleepy driver or detect whether a driver is ready to take over from an autonomous system.
- Radar and radar fusion to develop forward-sensing and automated parking applications.

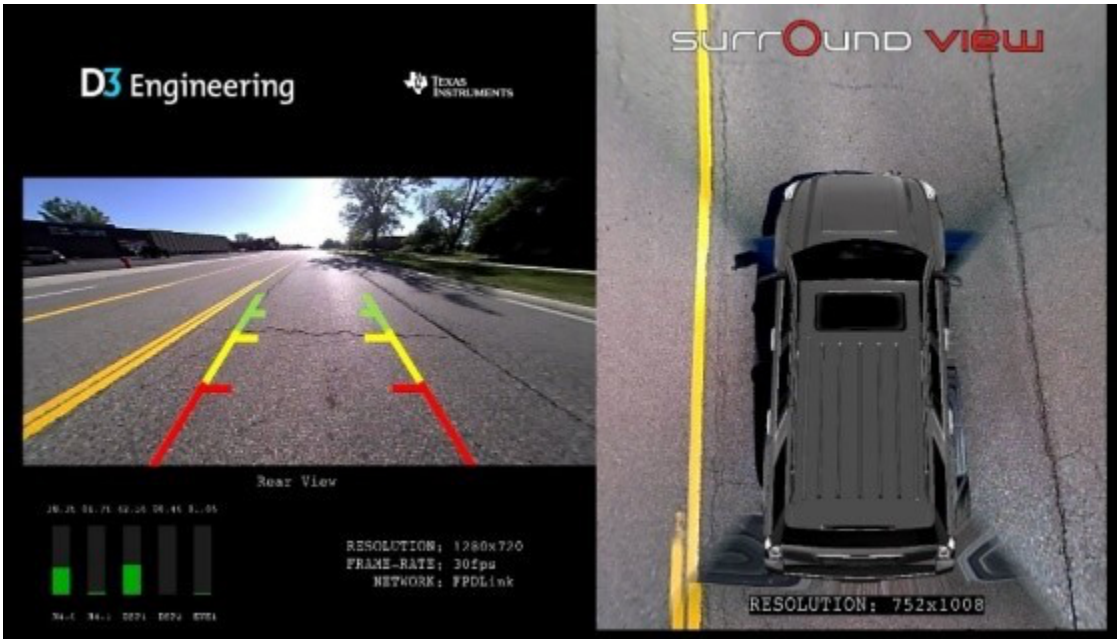

Figure 3. Surround-view High-definition Multimedia Interface (HDMI) Output

What's Next?

First, use a starter kit in the lab to develop your proof of concept and define the requirements of your production system. Then, move to an RVP development kit to quickly deploy the first phase of your production ADAS.

From there, you can continue development on your own or work with D3 Engineering for design services.

If you're developing ADAS or autonomous driving solutions, you can get to market faster with starter kits and development kits from TI's ADAS processor ecosystem of carefully selected design partners. The kits give you an advanced starting point for your design, and a scalable approach for moving from laboratory development to on-vehicle testing.

Learn more about TI's ADAS solutions.

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