

Welcome!

Texas Instruments New Product Update

- This webinar will be recorded and available at www.ti.com/npu
- Phone lines are muted
- Please post questions in the chat or contact your TI sales contact or field applications engineer

ACCELERATE INTELLIGENT MACHINES and CAMERAS DEVELOPMENT WITH TDA4 PROCESSOR & E-CON SYSTEM

New Product
Update

Manisha Agrawal

Product Marketing Manager, Texas Instruments

Gomathi Sankar

Business Unit Head of Industrial Cameras, e-Con systems

Agenda

- ❑ Intelligent machines and cameras, key technology enabler
- ❑ TDA4 processors for efficient design
- ❑ E-con featured technology (Global shutter camera, Serializer and Deserializer for AMR..etc.)
- ❑ Demo, and Q&A

Intelligent machines and cameras | Key technology enabler

Robots



More processing, less power

- More number of vision sensors
- More vision AI processing, 3D perception
- Lower power

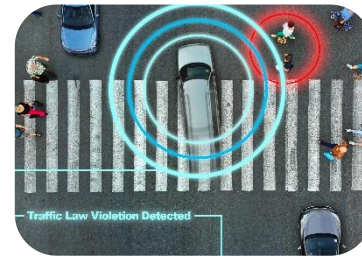
Mobile Machineries



Compact, cost-efficient design

- Small form-factor design
- Cost-optimized design

Smart traffic camera



Fast development

- Easy to develop software
- Rich 3P eco-system
- Rich community-system

TDA4 for intelligent machines and cameras | enable efficient design

More processing, less power: 1-12 cameras, 6W+

- ❑ 2-32 TOPS AI: 2x more FPS/TOPS compared to competition
- ❑ 2x power efficient compared to competition
- ❑ On chip ISP, LDC and Scaler hardware accelerators

Compact, cost-efficient design: Up to \$50 savings

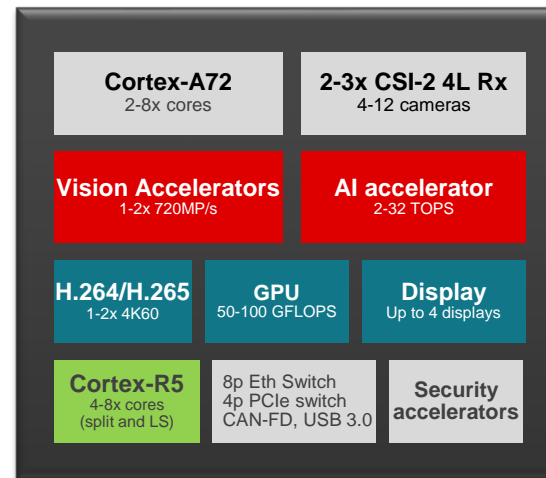
Pin-compatible devices with advance integration

- ❑ Integrated 2-8x R5 cores
- ❑ Functional safety up to ASIL-D, High Security, Auto grade
- ❑ Up to 8-port Ethernet and 4-port PCIe switch, CAN-FDs

Fast development: AI model deployment < 15 min

- ❑ Hardware agnostic programming
- ❑ Rich third-party ecosystem
- ❑ Community eco-system

TDA4x processor



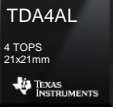






[Ti.com/product/TDA4VM](https://www.ti.com/product/TDA4VM)

TDA4x integrates components: Single chip solution for perception, vehicle controller and safety controller module
Enable efficient design: 2x more performance at ½ the power and cost

TDA4 family of processors

Pin-compatible

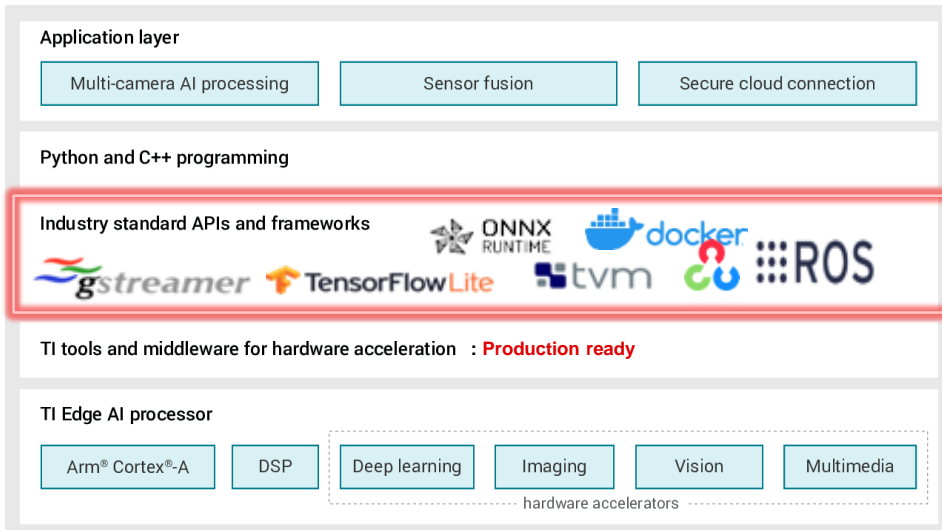
	<4 TOPS	4 TOPS	8 TOPS	8 TOPS	8 TOPS	32 TOPS
	<=8 cameras	8 cameras, 2x CSI-2 4L + GPU	8 cameras, 2x CSI-2 4L	8 cameras, 2x CSI-2 4L + GPU	8 cameras, 2x CSI-2 4L + GPU	12 cameras
						
	Coming soon	TI.com/product/TDA4VL-Q1	TI.com/product/TDA4AL-Q1	TI.com/product/TDA4VE-Q1	TI.com/product/TDA4VM-Q1	Coming soon ASIL-D
		2x Cortex-A72: 15K DMIPS	2x Cortex-A72: 25K DMIPS	2x Cortex-A72: 25K DMIPS	2x Cortex-A72: 25K DMIPS	
		ISP, LDC: 480 MPS	ISP, LDC: 720 MPS	ISP, LDC: 720 MPS	ISP, LDC: 720 MPS	
		Stereo vision, optical flow: Accelerator	Stereo vision, optical flow: Accelerator	Stereo vision, optical flow: Accelerator	Stereo vision, optical flow: Accelerator	
		Video: 4K30 H.264/5 Enc/Dec	Video: 4K60 H.264/5 Enc/Dec	Video: 4K60 H.264/5 Enc/Dec	Video: 4K60 H.264/5 Dec, 2x1080p Enc	
		Interface: 1x PCIe3 1L, 1x USB 3, 1x USB2, 2x GbE	Interface: 1x PCIe3 1L, 1x USB 3, 1x USB2, 2x GbE	Interface: 1x USB3.0/2.0, 1x PCIe Gen3 4L + 2x GbE	Interface: 2x USB2.0/3.0 + 4p PCIe3 + Ethernet 8p 2.5/1Gbps or 2x QSGMII	
SOM		PHYTEC	PHYTEC	PHYTEC	TechNexion 	TechNexion

TI offers right balance of performance, power and cost for broad range of designs with **unified software!**

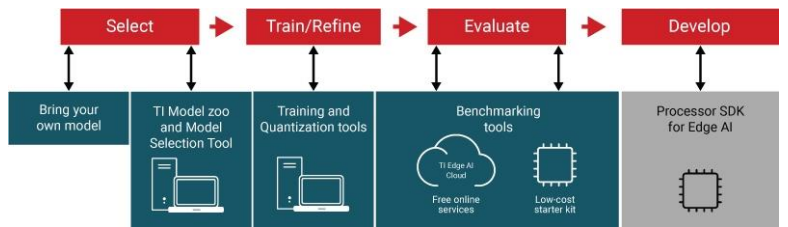
Hardware agnostic accelerated programming, **rich tools and eco-system**

Easy programming with Industry standard APIs

Gstreamer command line based development



Extensive tools for faster development, < 15 min



No-code and low-code AI tools:
Data capture to model training and deployment: < 15 min

Community and enterprise service

<https://docs.edgeimpulse.com/docs/development-platforms/officially-supported-cpu-gpu-targets/sk-tda4vm>

- TI Model Zoo: 100s of optimized AI models**
- Classification
 - Detection
 - Semantic segmentation
 - 3D Point cloud
 - Pose estimation
 - Face detection
 - More
- MobileNetVX, SSD
 - EfficientNet/Det
 - ResNet
 - RegNetX
 - YoloX, YOLOv4/5
 - FPNLite, DeepLabv3
 - PointPillars
 - Transformer
 - More

Academies | edge AI, Robotics and Safety

Robotics and edge AI academy



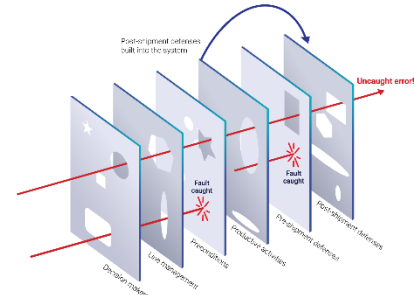
Multi-sensor, AI enabled robot



[Ti.com/roboticsacademy](https://www.ti.com/roboticsacademy)
[Ti.com/edgeaiacademy](https://www.ti.com/edgeaiacademy)

- ❑ **TDA4VM** for Perception, vehicle and safety controller
- ❑ **FPD-Link** for camera connection
- ❑ **IWR6843** mmWave Radar sensor
- ❑ **C2000** for motor Control
- ❑ **TI DLP** for communication via projection

BlackBerry QNX Safety academy



[Ti.com/blackberryqnxacademy](https://www.ti.com/blackberryqnxacademy)

Create a company safety culture

With the BlackBerry QNX Academy for Functional Safety, you'll have access to materials from the world's foremost functional safety experts.

You'll learn:

- how to create a safety culture
- fundamental safety terminology
- how to prepare and structure a safety case
- how to minimize faults, errors, and failures
- considerations for ensuring safety after deployment

Self-learn at your own pace | No-cost



Robots & Mobile Machineries

APPLICATIONS

- Delivery, Warehouse & Cleaning, Pick & Place Robots

WHY CAMERAS

- 3D camera – Localization, Mapping & Navigation
- Object Detection – Scan and find markers & other objects

PROBLEMS

- Ability to produce sharp images while robot is in motion.
- Varying lighting in warehouse (5lux to 500lux)
- Environmental challenges, reliability

SOLUTIONS

- Global shutter cameras
- HDR + LFM,
- IP67 rating, shock and vibration tested, Safety Certified (ISO26262, ASIL-B)

TYPICAL CAMERAS



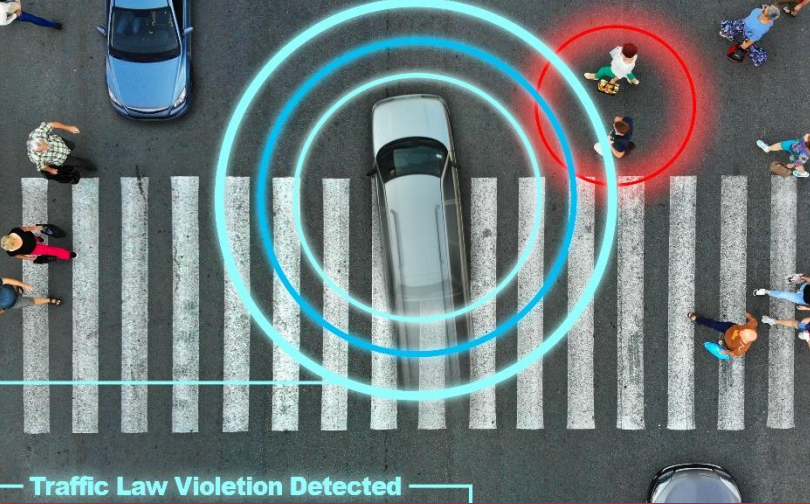
e-CAM24_CUNX
Full HD MIPI CSI-2 Global Shutter



STURDeCAM21
Full HD GMSL2 HDR Camera



DepthVista
3D ToF camera



Smart Traffic Camera

APPLICATIONS

- Intelligent Video Analytics / Intelligent Transport Systems

WHY CAMERAS

- Data collection for analytics – set rules for traffic lights

PROBLEMS

- Capture minute details from a distance
- Fast moving objects
- Outdoor environments have vastly varying lighting conditions

SOLUTIONS

- High resolution HDR cameras
- Global shutter
- Special optics design to reduce flare

TYPICAL CAMERAS



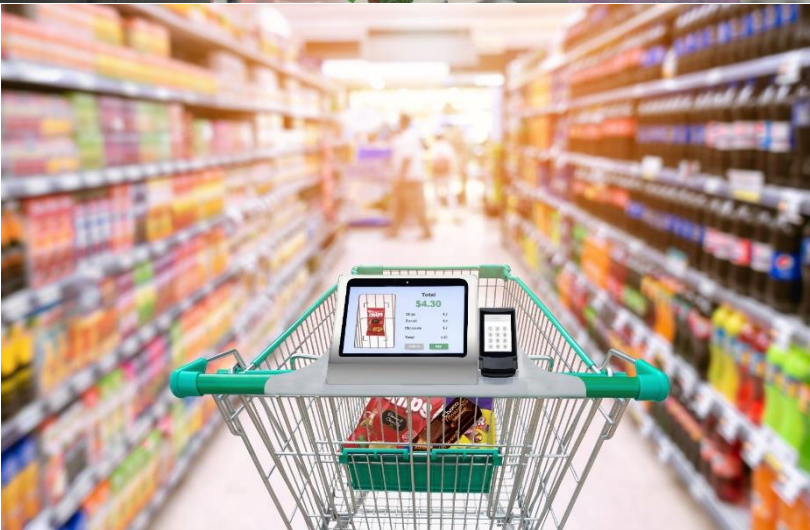
See3CAM_CU81
4K HDR USB Camera



NileCAM21
Full HD GMSL2 HDR Camera
with LFM



NeduCAM25
Global shutter
FPD Link-III Camera



Retail Automation

APPLICATIONS

- Smart Shopping

WHY CAMERAS

- People Identification & tracking
- Product recognition

PROBLEMS

- Occlusion, Fast moving objects
- Color reproduction

SOLUTIONS

- Multi-camera synchronization, Global shutter
- ISP tuning for high color accuracy

TYPICAL CAMERAS



RouteCAM
Full HD GigE Camera



See3CAM24_CUG
Full HD Global Shutter Camera



See3CAM_CU130
13MP USB Camera

APPLICATIONS



Robots & Mobile Machineries



Smart Traffic Camera



Retail Automation



Medical & Life sciences



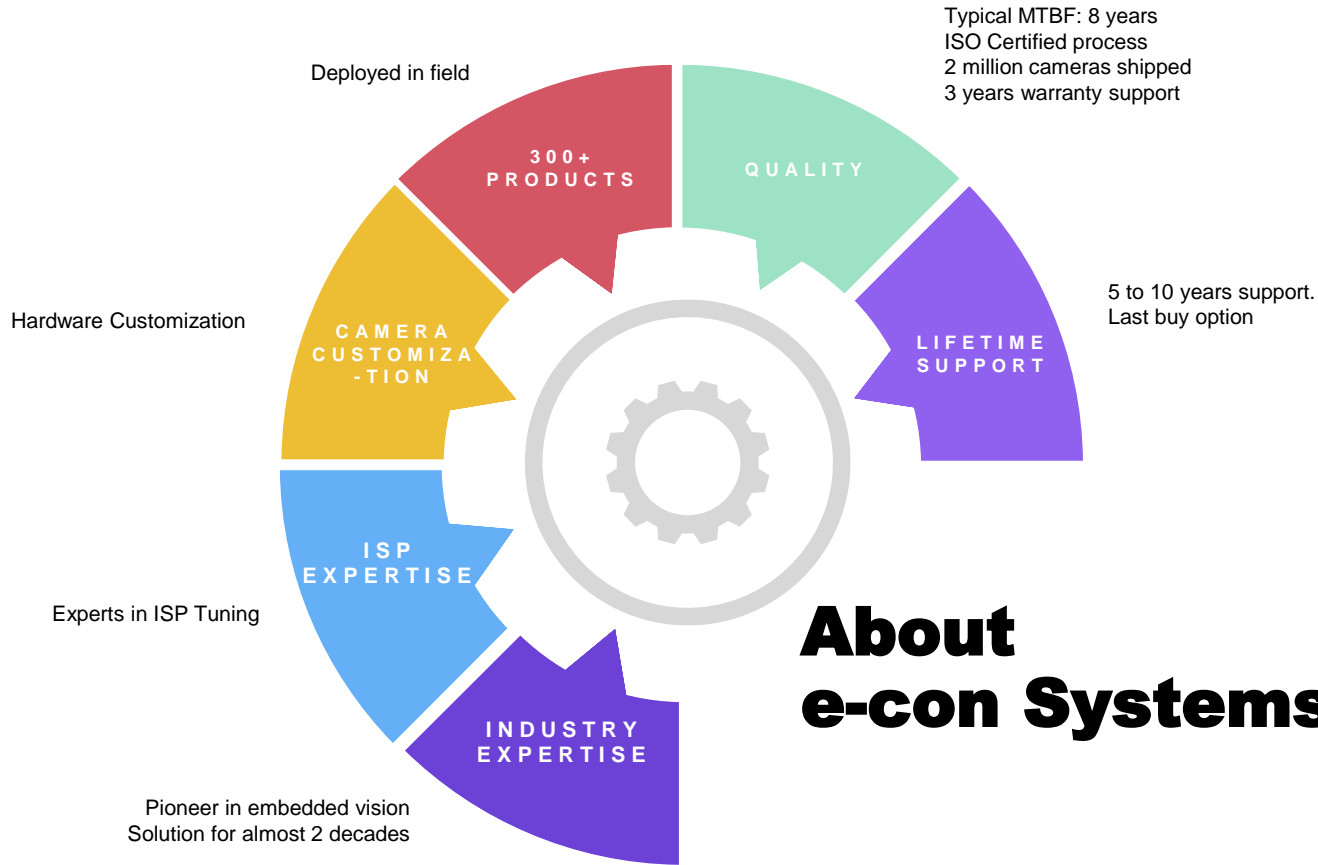
Sports Broadcasting



Biometric access control



Smart Farming



About e-con Systems

Surround View Demo Video

Getting started

You can start evaluating this device leveraging the following:

Content type	Content title	Link to content or more details
Product folder	<ul style="list-style-type: none">TDA4VMTDA4VETDA4ALTDA4VL	https://www.ti.com/product/TDA4VM-Q1 https://www.ti.com/product/TDA4VE-Q1 https://www.ti.com/product/TDA4AL-Q1 https://www.ti.com/product/TDA4VL-Q1
Academy	<ul style="list-style-type: none">Robotics acadmeyEdge AI academyBlackberry QNX Safet Academy	ti.com/roboticsacademy Ti.com/edgeaiacademy Ti.com/blackberryqnxacademy
Customer training series or webinar session	<ul style="list-style-type: none">Edge AI technology	https://training.ti.com/process-edge-ai-technology-topics Ti.com/edgeai
Technical blog content or white paper	<ul style="list-style-type: none">Designing an efficient edge AI systemSimplify embedded edge AI application developmentsensors-and-processors-creating-more-intelligent-and-autonomous-robots	https://www.ti.com/lit/wp/spry344/spry344.pdf https://e2e.ti.com/blogs_/b/process/posts/simplify-embedded-edge-ai-development https://e2e.ti.com/blogs_/b/process/posts/sensors-and-processors-creating-more-intelligent-and-autonomous-robots
Development tool or evaluation kit	<ul style="list-style-type: none">TDA4VM Starter KitEdge AI Cloud	Ti.com/tool/SK-TDA4VM Ti.com/edgeaicloud

Free help on e2e.ti.com

Visit www.ti.com/npu

For more information on the New Product Update series, calendar and archived recordings



© Copyright 2022 Texas Instruments Incorporated. All rights reserved.

This material is provided strictly “as-is,” for informational purposes only, and without any warranty.
Use of this material is subject to TI's **Terms of Use**, viewable at [TI.com](https://www.ti.com)

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#) or other applicable terms available either on [ti.com](https://www.ti.com) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2023, Texas Instruments Incorporated