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passion for video

A unified visual computing platform

September 24th, 2019 | www.videantis.com

Industry trend – embedding cameras in phones

iPhone 1
2007
Front cam
1 camera

iPhone 4
2010
+Selfie cam
2 cameras

iPhone 5s
2013
+Touch ID
3 cameras

iPhone 7+
2016
+Dual cam
4 cameras

iPhone X
2017
+Face ID
4 cameras

iPhone 11 Pro
2019
+Triple cam
5 cameras

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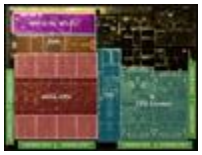
Industry trend – embedding cameras in cars

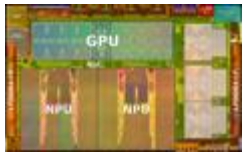
Roadster
2008
Rear
1 camera

Model S
2012
Rear
1 camera

Model S
2014
+Front
2 cameras



NVIDIA GPU
2016
3F, 4S, 1R
8 cameras



Tesla FSD SOC
2019
260mm^2
72 TOPS

Our mission: giving machines the power of sight

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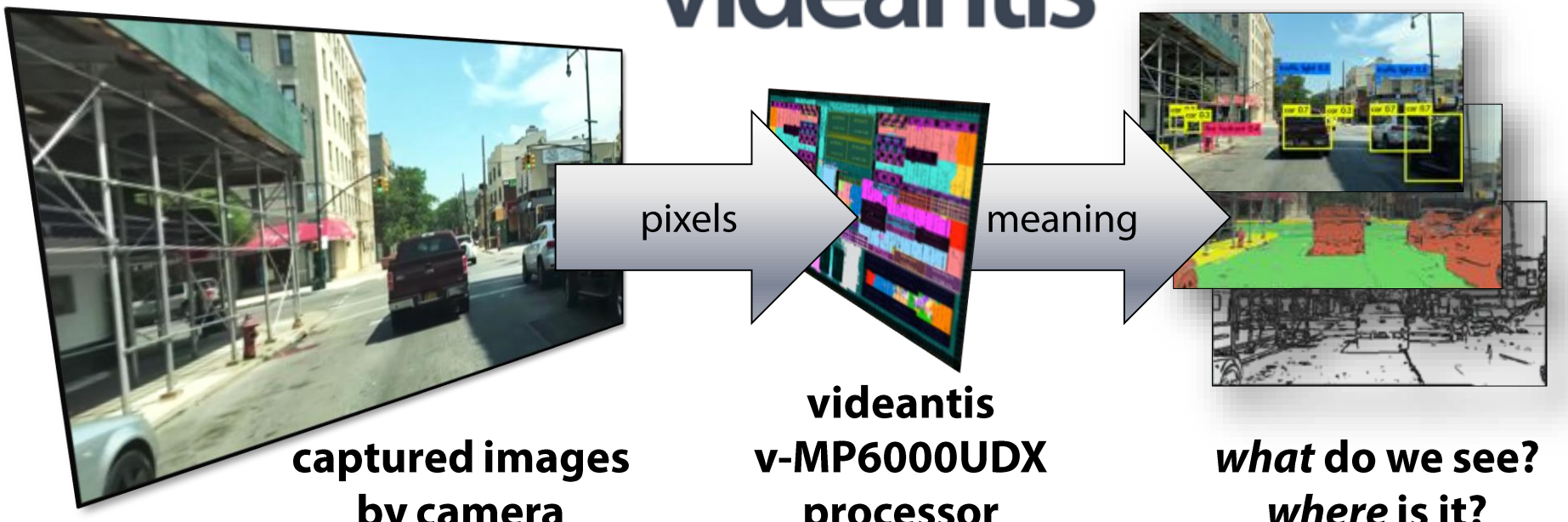

captured images by camera

videantis v-MP6000UDX processor

***what* do we see?**
***where* is it?**

Use case: computer vision and deep learning in self-driving cars

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Intelligent vehicles – a tale of two roads

Future

Proof of concept
Cost no issue
Zero accidents
Research

Goal:

L5 / Robotaxi
Cost no issue

Today

100 million cars per year
Consumer price points
1.3M deaths (WHO)
Business

Goal:

Increase safety
& comfort
Must be low cost

videantis focuses on high volume market

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Semiconductor BOM budget

<$100

$2000

Need cost scalable and modular solutions

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Processing capabilities are power limited

Inside camera

<1W

Behind mirror

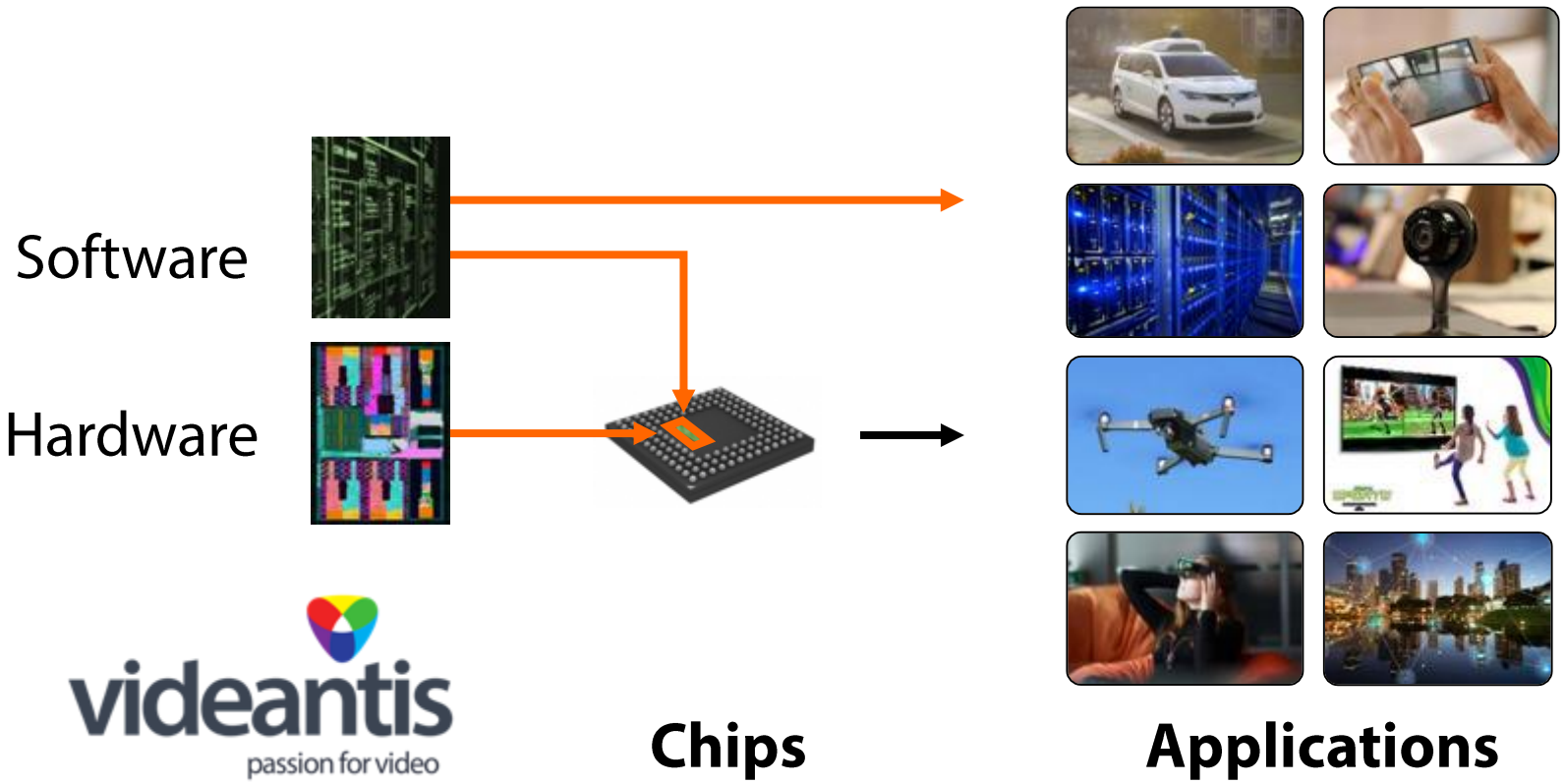
5-10W

Inside box

10-100W

Need low power and scalable solutions

About videantis – place in the value chain



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videantis provides key processing technology for all embedded vision markets

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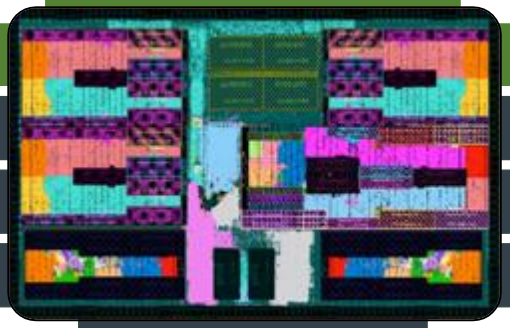
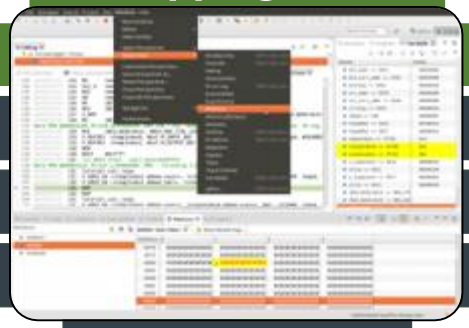
v-MP6000UDX: Integrated product offering for deep learning and visual computing

Deep learning

Computer vision

Image processing

Video coding

v-MP6000UDX architecture	CNN libraries of optimized kernels	v-CNNDesigner mapping tool
		
Processor	**Software**	**Tools**
1-256 cores	**16384 MACs per cycle**	**Backward compatible**

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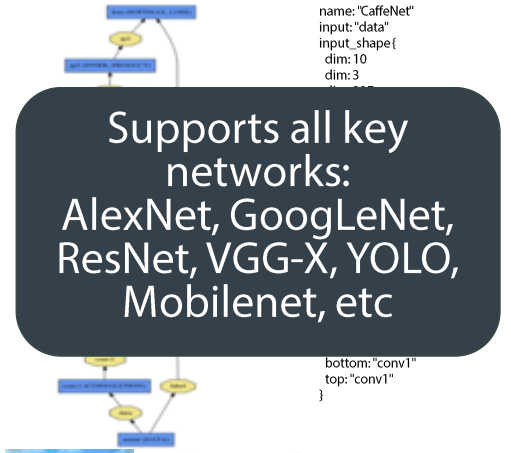
v-CNNDesigner push-button code generation

Train & define CNN network → Map → Run

Caffe/Caffe2, Tensorflow, PyTorch, etc

CNN Algorithm Topology (Layers & Parameters)

High-Level Network Definition



Supports all key networks: AlexNet, GoogLeNet, ResNet, VGG-X, YOLO, Mobilenet, etc

Images

Labeling

Developer

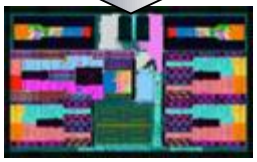
CNN mapping

- Data type analysis
- Data type optimization
- Low power optimization
- Optimal distributed memory allocation
- Memory & bandwidth minimization
- Multicore partitioning & mapping

v-CNNDesigner

v-CNN application

Optimized v-CNNLib kernel library



v-MP6000UDX processor

Runs and optimizes your CNNs in minutes

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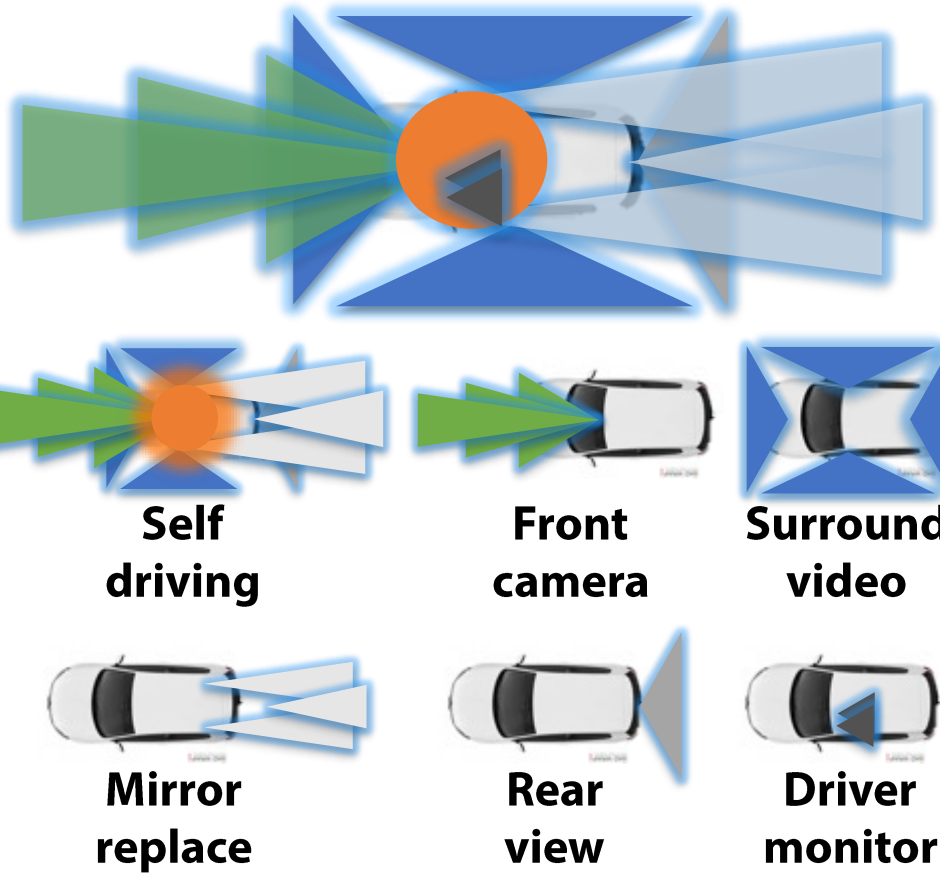
Comprehensive solution supporting autonomous driving and ADAS

Trends:

- Processing sensor data crucial to autonomous drive and ADAS
- Industry marching toward 10+ cameras/car, 20+ sensors

videantis automotive targets:

- Deep learning on all sensors
- In-camera, ECU and central processing solutions
- Sensor fusion with radar, Lidar, ultrasound and night vision
- Codecs for automotive Ethernet



Unified architecture with software compatibility reduces development cost

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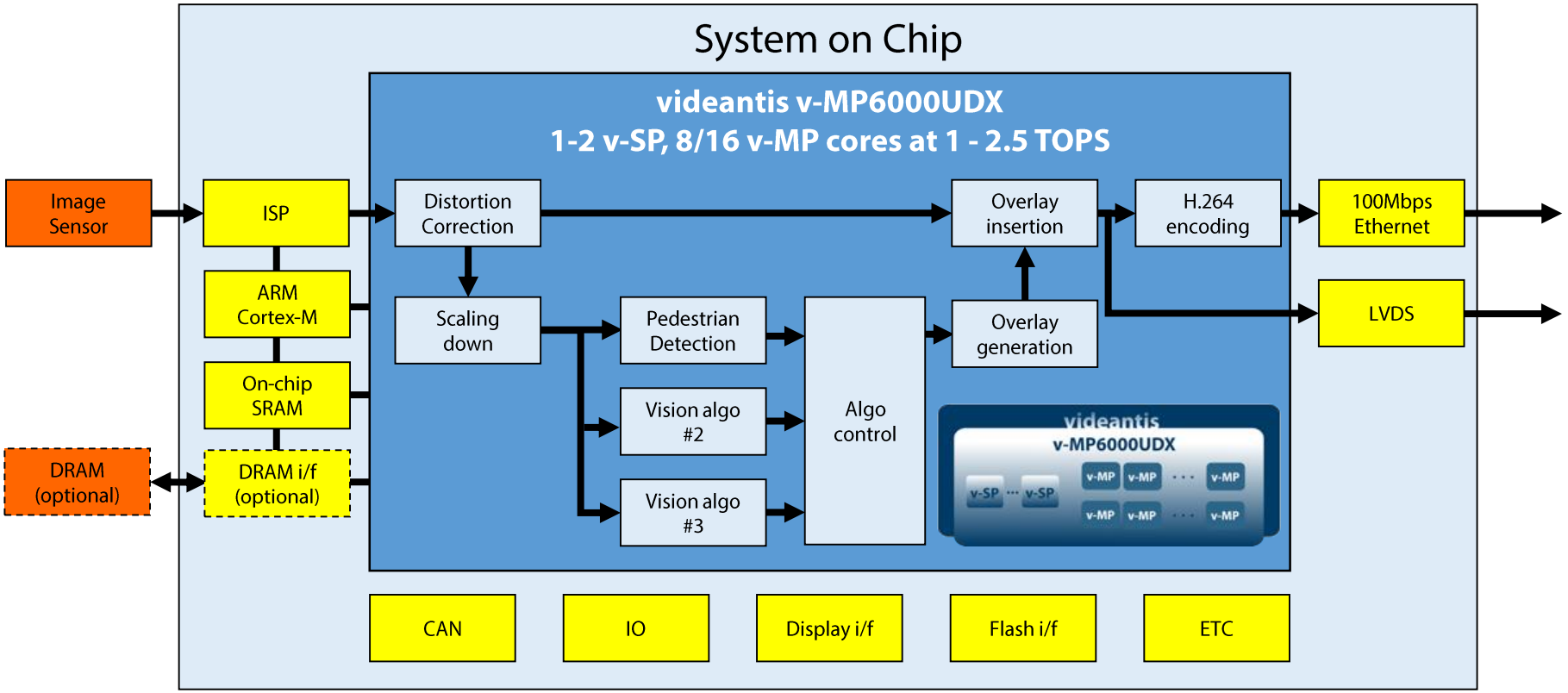
Smart automotive backup camera at <1W



Lowest power intelligent rear/surround view SOC

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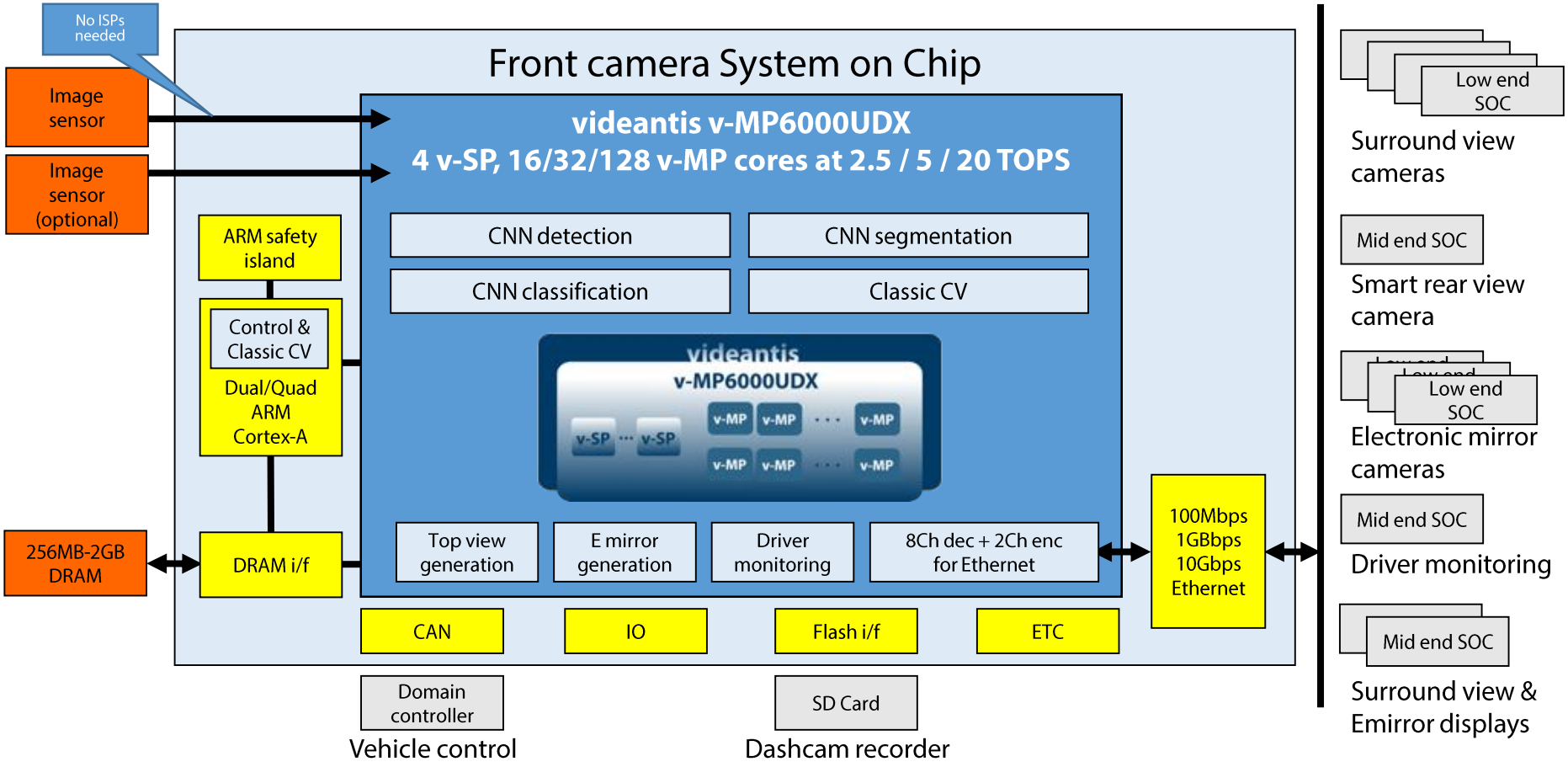
Automotive front camera at <5-10W



Lowest power deep learning automotive front view SOC

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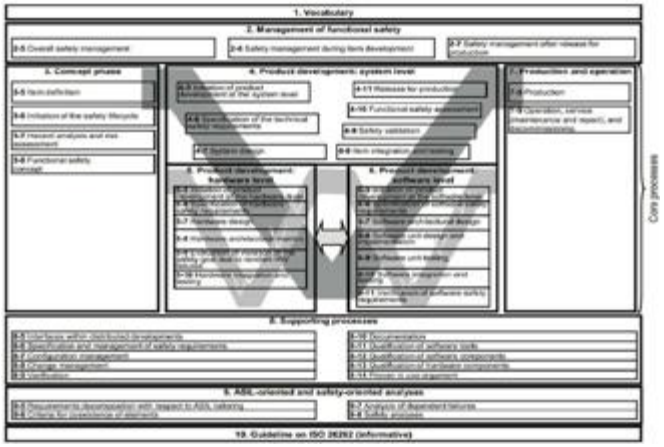
Developed for Automotive Safety

Process	Hardware	Software	Support
Automotive development processes ISO 26262, ASPICE, MISRA, Coverage, Requirements mgmt, etc	Redundancy ECC memories Built-in self test Watchdog timers	Redundancy Test and validation Tools Software Libraries Qualification	Documentation Helpdesk Ticketing Automotive long-term SLAs



ASIL QM
ASIL A
ASIL B
ASIL C
ASIL D

Key requirements for production-ready automotive solutions

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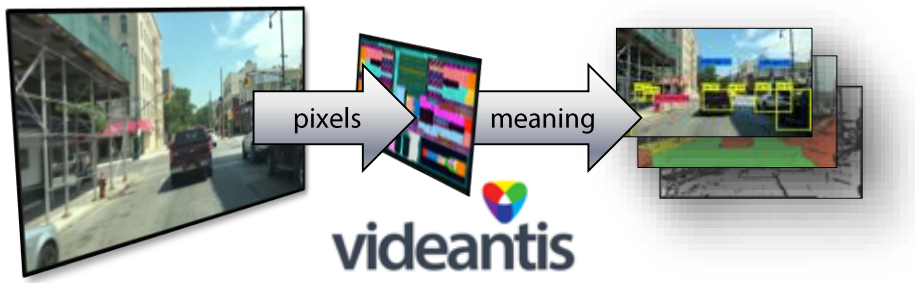
Summary

v-MP6000UDX visual processor family

- Single unified architecture runs all visual processing tasks, saving power, area, time-to-market, extending product life
- Scalable from ultra low cost to extreme performance
- v-CNNDesigner tool for easy porting of neural nets
- Seamless upgrade path from large installed base of devices
- Production-grade automotive quality and functional safety

Cost-scalable low-power solution for high volume markets

Giving electronics the power of sight



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Thank you !

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