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# Image Sensor Solutions

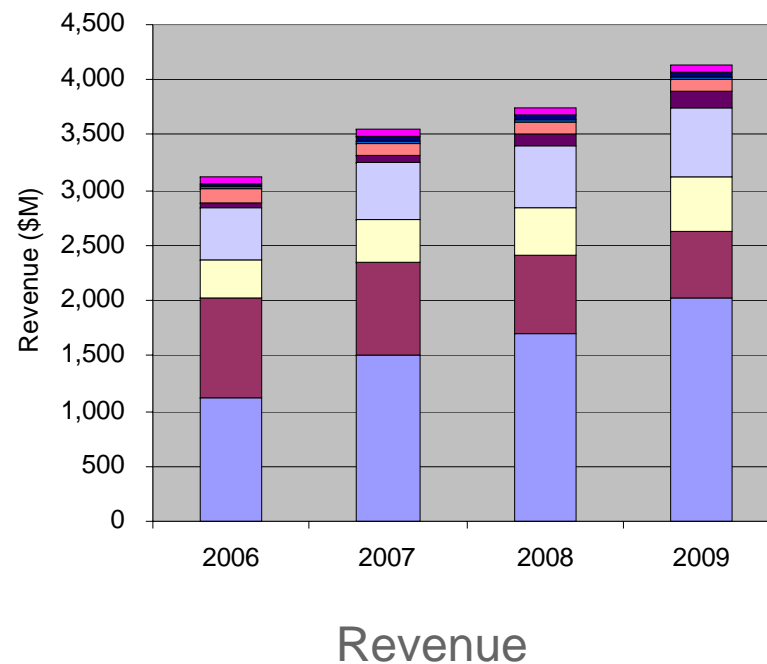
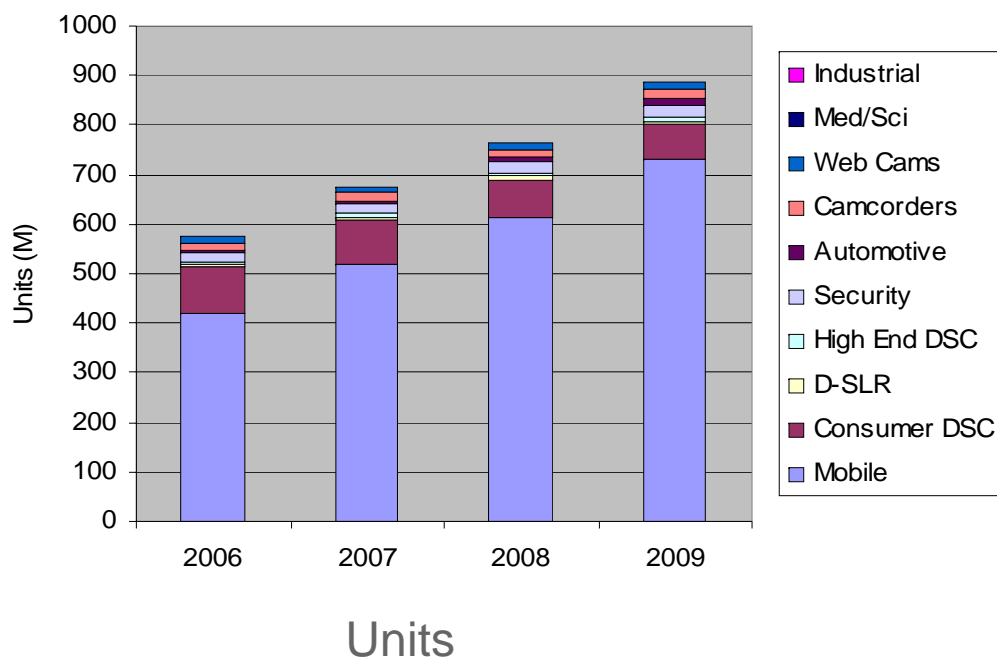
## Overview Presentation

**Kodak**

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# Worldwide Image Sensor Markets

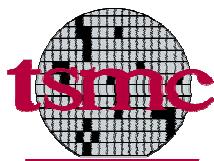


Source: TSR, Strategies Unlimited, IDC, ISS, CDG

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# Image Sensor Solutions

- World leader in image sensor design & development
  - 25+ years CCD experience
  - Leader in high performance CCDs
  - 15+ years CMOS design experience
- CCD and CMOS manufacturing capabilities
  - CCD manufacturing in EK Rochester Fab
  - CMOS via foundry relationships



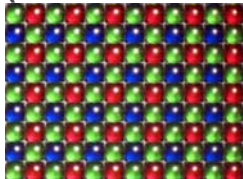
- Strong IP position
- Worldwide sales and engineering support



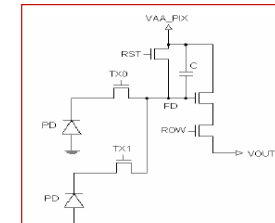
# Kodak Image Sensors

## Continuous Leadership

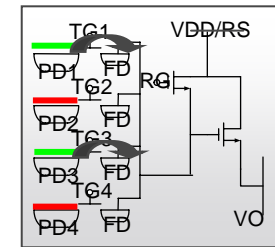
Bayer Pattern Array  
(Kodak Patent – 1975)



First Consumer Camera  
Apple QuickTake (1994)



Foundation CIS Patent  
4T-Pinned Diode



On-chip CMOS  
charge binning

1975 — 1980 — 1985 — 1990 — 1995 — 2000 — 2005 —



World's First  
Prototype  
Camera (1976)

First Megapixel  
Sensor (1986)

Mars Rover  
Camera (1997)

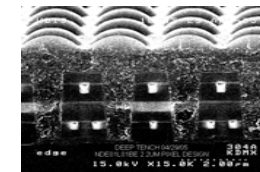


First 22 Megapixel  
Sensor (2002)

National  
Semiconductor  
Sensor  
Acquisition (2004)



39 Megapixel  
Sensor (2005)



CMOS Light Pipe

*300+ CCD/sensor patents, 70+ CMOS sensor patents*

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# A Unique Business for Kodak

- Vertical business structure
  - direct sales force
  - integrated manufacturing
- Driven by “design wins”
- Selling process targets engineers
- Longer cycle to revenue
- Driving the technology is the top priority
  - innovation favors creative marketing

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# Image Sensor Types

- CCD
  - Traditional image sensor devices
  - Specialized manufacturing process
  - Typically has higher image quality
  - Used in consumer DSC, industrial, scientific applications
- CMOS Image Sensor (CIS)
  - Growing market penetration
  - Uses more common manufacturing platforms
  - Enables greater on-chip integration, lower power consumption
  - Mobile and D-SLR applications today

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## Kodak ISS Key Strategic Initiatives

Drive profitability as the leading supplier of CCD image sensors into high performance imaging markets

Accelerate profitable growth and drive scale by offering differentiated CMOS sensor products into consumer imaging markets

Be a key component supplier supporting Kodak's digital initiatives in consumer DSC and mobile applications by delivering differentiated, cost effective CMOS sensors



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# Markets for Kodak Image Sensors

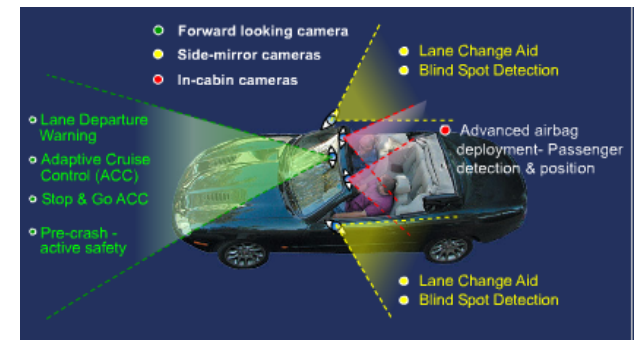
## Digital Cameras



## Camera Phones



## Automotive



## Industrial Vision



## Scientific



## Medical

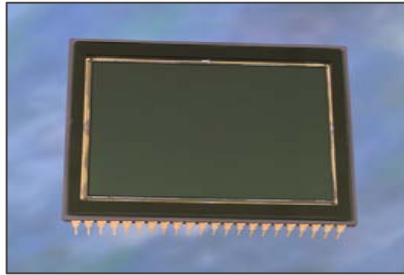




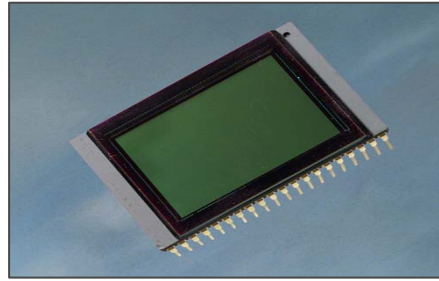


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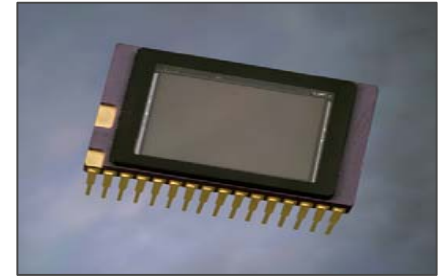
# Photokina 2006



Kodak 39 Megapixel  
CCD Sensor



Kodak 10 Megapixel  
APS CCD Sensor



Kodak 10 Megapixel  
4/3 CCD Sensor



Hasselblad H3D Medium  
Format D-SLR



Leica M8 35mm D-SLR



Olympus E-400 4/3  
Format D-SLR

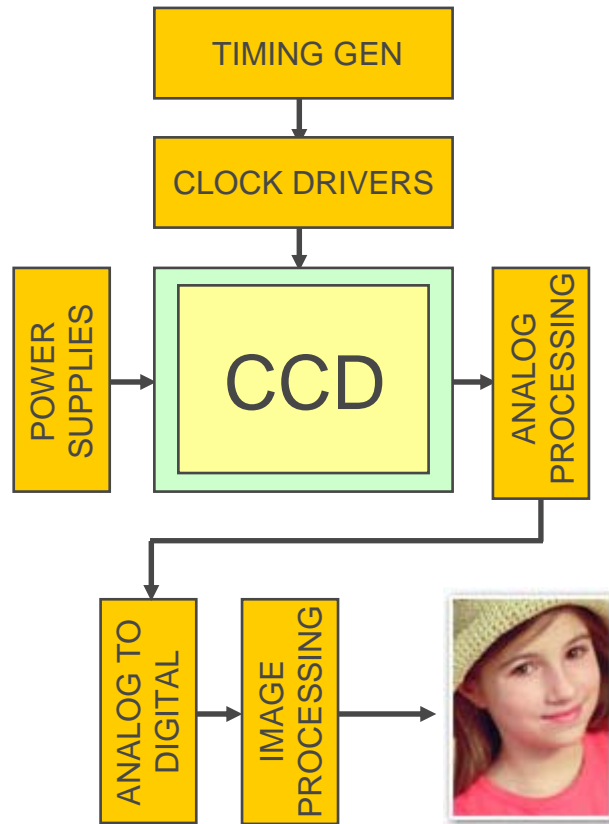
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## ISS CCD Capabilities

- CCD Wafer Fabrication Facility
  - 15,000 sq. ft. clean room (Class 10 / 100)
- On-site CCD Packaging and Test operations
- Flow refined for production of “specialty” CCD products
  - “Large pixel” devices ( $>4\mu\text{m}$  pixel geometry)
  - Ultra-low dark current



## CCD Sensors



Excellent image quality

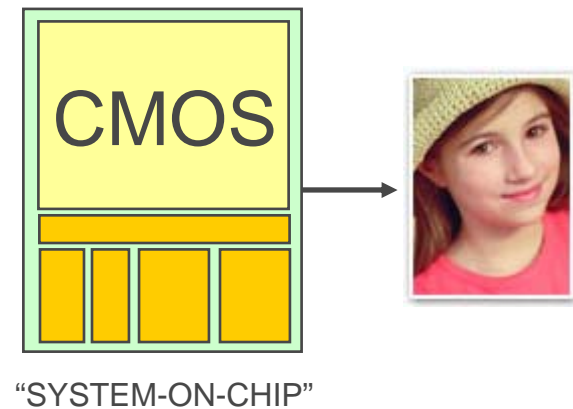
Nominal power consumption

Requires external circuitry

Nominal cost

Larger camera size

## CMOS Sensors



Good image quality - improving rapidly

Lower power consumption

Highly integrated

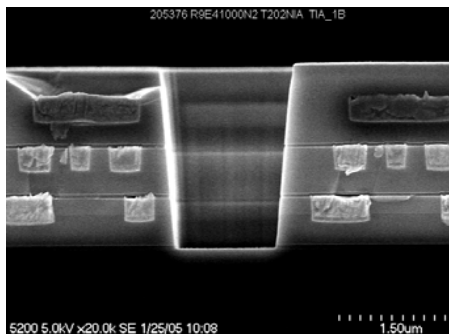
Lower cost

Smaller camera size

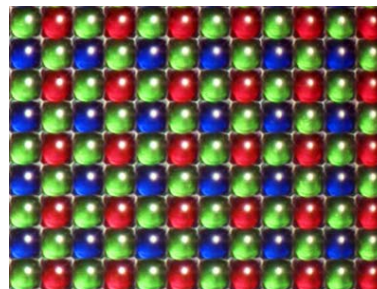
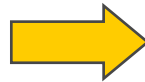
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# Kodak's Winning Strategy for CMOS

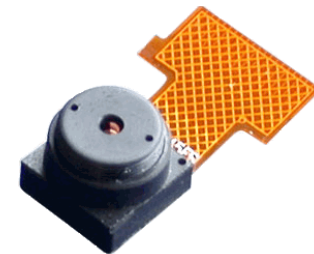
- Deliver Kodak imaging expertise in silicon
- World class image sensor capability
- Leverage corporate partnerships
- Innovation and design leadership



Pixel



Sensor



Camera Module

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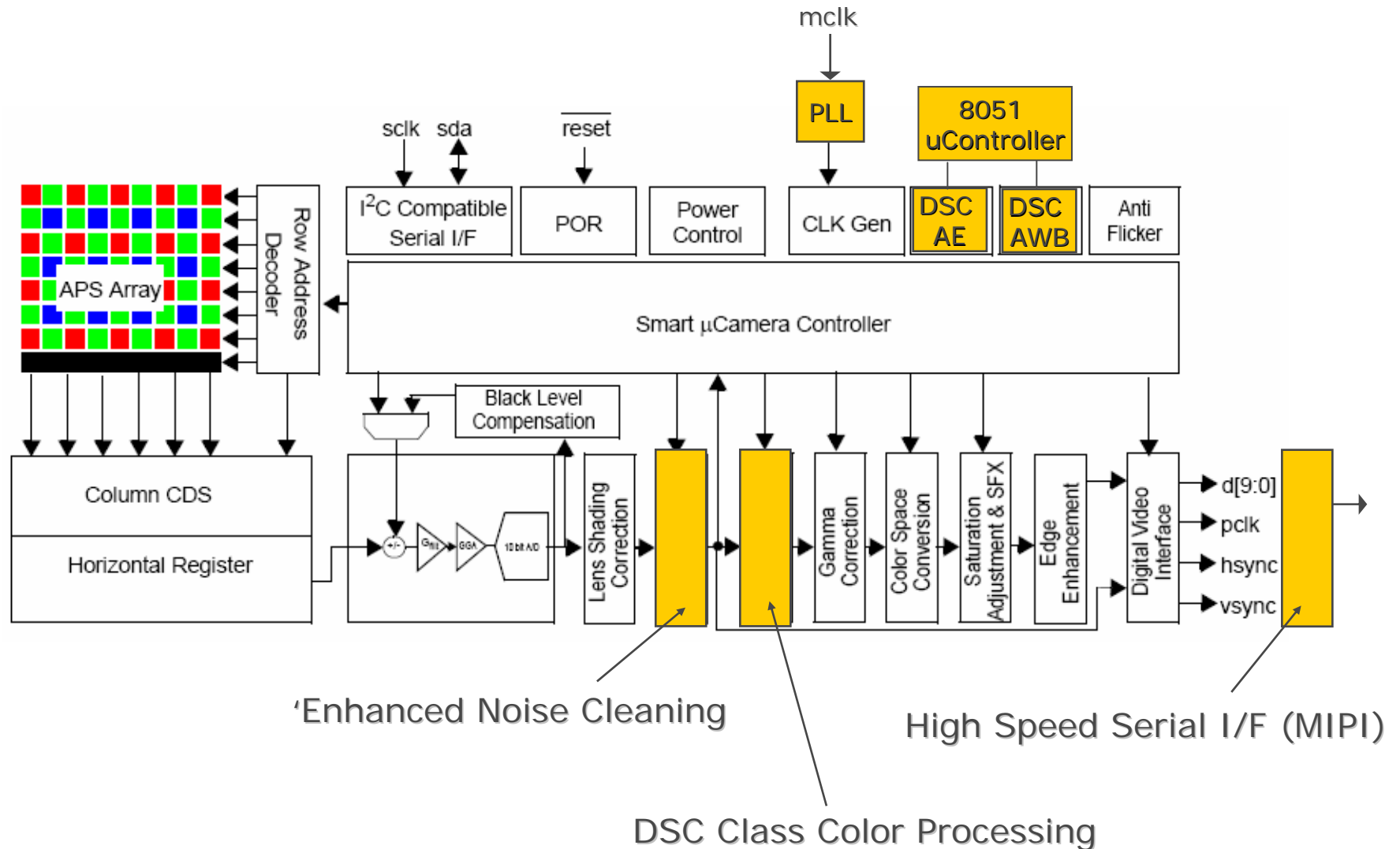
## Kodak ISS - West

- Acquisition of NSC Imaging team completed September 2004
- Key skill sets added for circuit design & commercialization
- Beneficial Silicon Valley presence



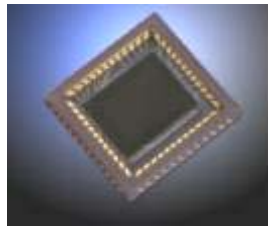
Sunnyvale, CA

# Enhanced System-on-a-Chip Image Processing





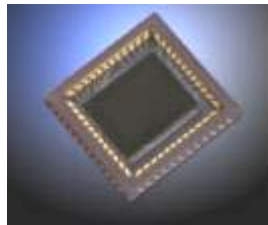
# CMOS Sensor Growth Opportunities



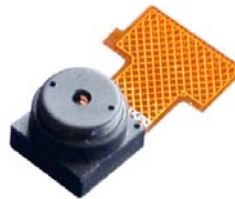
KODAK SENSOR



Consumer  
Digital  
Cameras

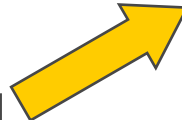


KODAK SENSOR



Camera  
Phones

Lens  
Partner



Module  
Partner

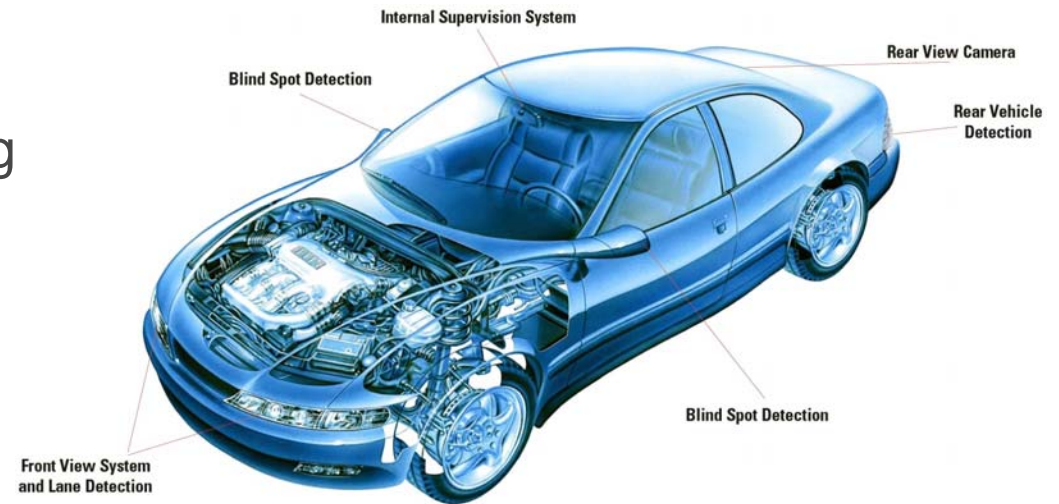


Chipset  
Partner

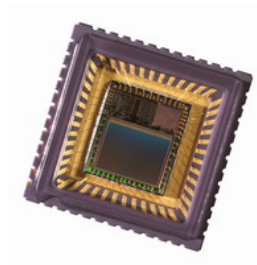


# Automotive Imaging

- Lane Departure Warning
- Advanced Collision Warning
- Blind Spot Detection
- Rear View
- Internal Viewing
- Black Box



KAC-9619 Blind Spot Information System  
Volvo 2006 Models

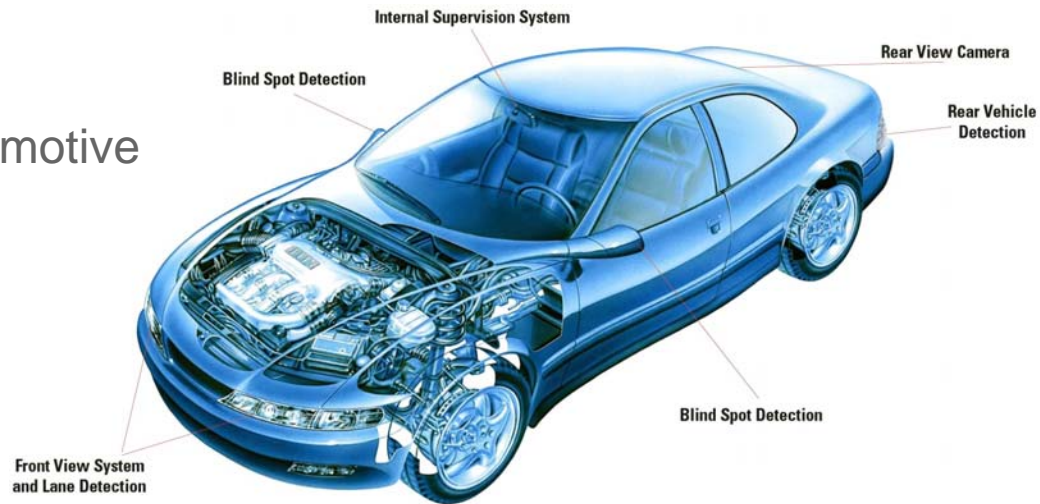


KAC-9619 Advanced Warning  
Mobileye Aftermarket Product

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# Cameras Anywhere / Everywhere

## Automotive



## Security & Surveillance



## Medical



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# Kodak Image Sensor Solutions

