JABIL OPTICS OVERVIEW

OUR KEY BRANDS	JABIL	NYPRO A JABIL COMPANY	GREEN POINT A JABIL COMPANY

OUR STRENGTH & SCALE	180K+ DEDICATED EMPLOYEES	100 LOCATIONS IN 28 COUNTRIES	17,000 SUPPLIERS	1,600 CAPABILITIES	250 TOP BRANDS	50 YEARS OF MANUFACTURING & SUPPLY CHAIN EXPERIENCE	$18B REVENUE	$1.2B OPERATING CASH FLOW

OUR FOUNDATION	INTELLIGENT DIGITAL SUPPLY CHAIN	+	IP PROTECTION	+	SOCIAL & ENVIRONMENTAL RESPONSIBILITY	+	OPERATIONAL EXCELLENCE	+	PEOPLE & ENTREPRENEURIAL CULTURE

OUR END-TO-END SOLUTIONS

DESIGN — Strategy & Innovation → DEVELOP — Design Engineering → INDUSTRIALIZE — Process & Test Engineering → MANUFACTURE — Fabrication & Assembly → DELIVER — Configure to Order & After Market
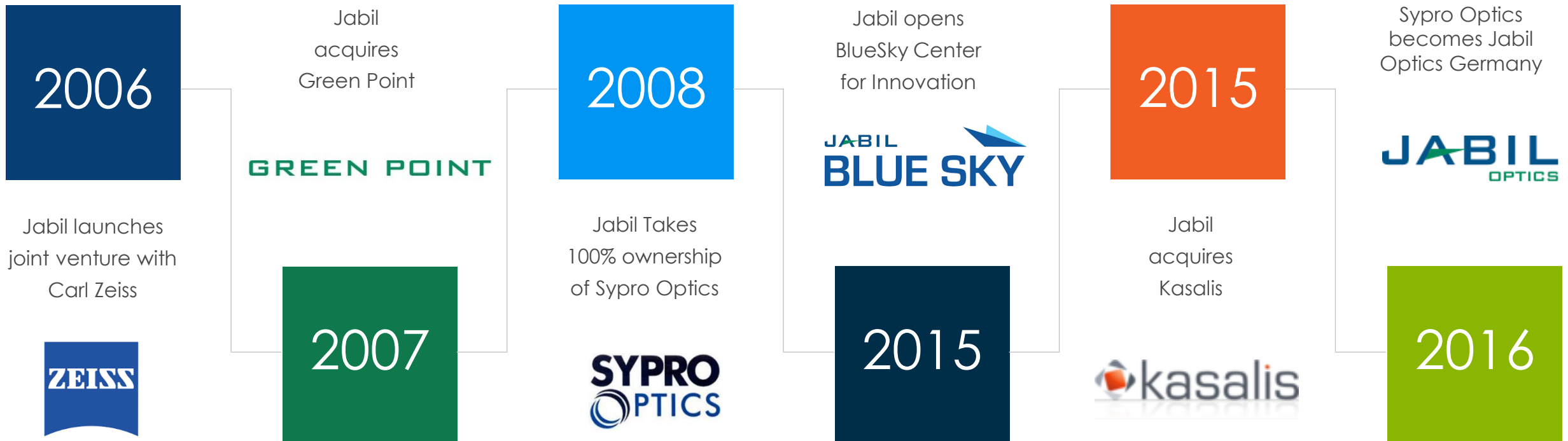
OUR STRATEGIC CAPABILITIES

GROWTH STRATEGY	EXPERIENCE DESIGN	AUTOMATION	ADDITIVE MANUFACTURING	DIGITAL PROTOTYPING	PRECISION MECHANICS	DRONES	ROBOTICS
ADVANCED ASSEMBLY & MINIATURIZATION	DYNAMIC TUNING	ADHESIVES	PRINTED ELECTRONICS	ACOUSTICS	FLUIDICS	POWER ELECTRONICS	OPTICS
SENSORS	E-TEXTILES	WIRELESS CONNECTIVITY	MATERIALS TECHNOLOGY	PRECISION TOOLING	CLOUD SYSTEMS INTEGRATION	OPTICAL NETWORKING	VALUE ENGINEERING

OUR MARKETS

DIGITAL HOME & OFFICE · MOBILITY & WEARABLES · RETAIL · SMART PACKAGING · HEALTHCARE · ENTERPRISE & INFRASTRUCTURE · PRINTING · TELECOM-MUNICATIONS · TRANSPORTATION · INDUSTRIAL · ENERGY · AEROSPACE

JABIL OPTICS

JABIL OPTICS: INVESTING IN THE FUTURE

2006

Jabil launches joint venture with Carl Zeiss

ZEISS

Jabil acquires Green Point

GREEN POINT

2007

2008

Jabil Takes 100% ownership of Sypro Optics

SYPRO OPTICS

Jabil opens BlueSky Center for Innovation

JABIL BLUE SKY

2015

2015

Jabil acquires Kasalis

kasalis

Sypro Optics becomes Jabil Optics Germany

JABIL OPTICS

2016

Through strategic investments, Jabil has become a world-class manufacturing partner in optics.

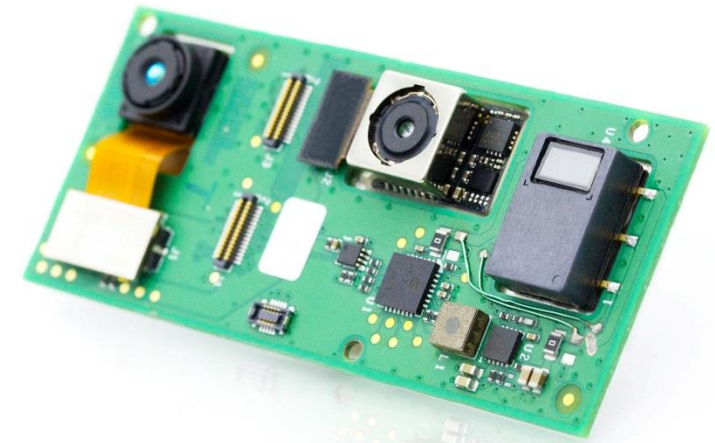JABIL OPTICS

CORE SOLUTIONS

COMPUTATIONAL CAMERAS

Advanced optics encode
visual information for
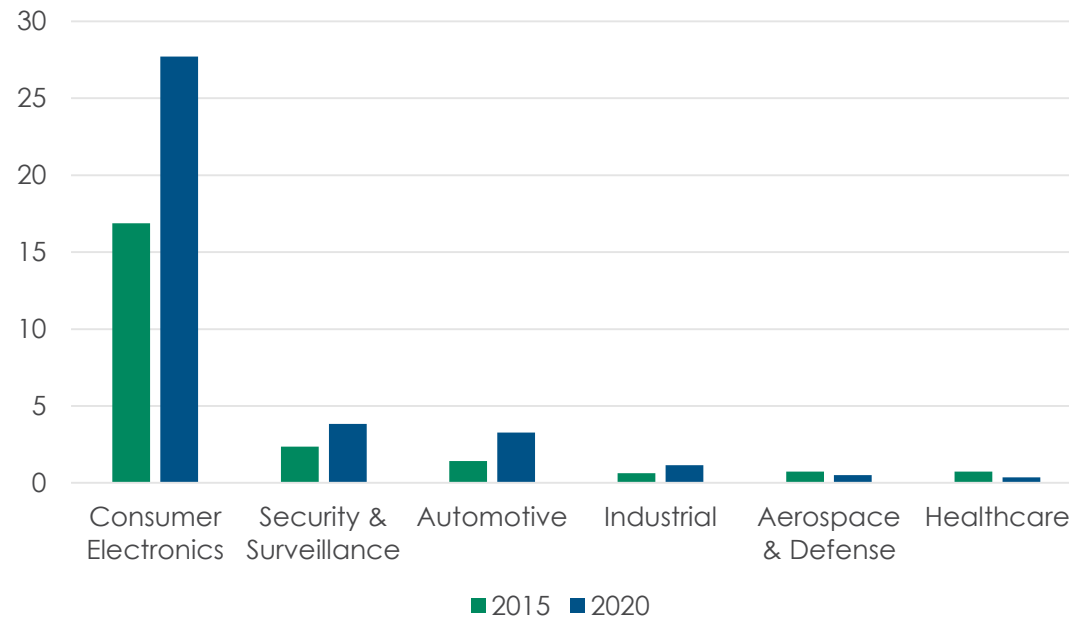next-generation applications

PROJECTION SYSTEMS

Miniaturized projection systems
for RGB image projector modules
and IR pattern projector modules

JABIL
OPTICS

GROWING MARKETS

Camera Module Market, by Application, 2015 vs 2020, USD Billions

Legend: ■ 2015 ■ 2020

Categories: Consumer Electronics, Security & Surveillance, Automotive, Industrial, Aerospace & Defense, Healthcare
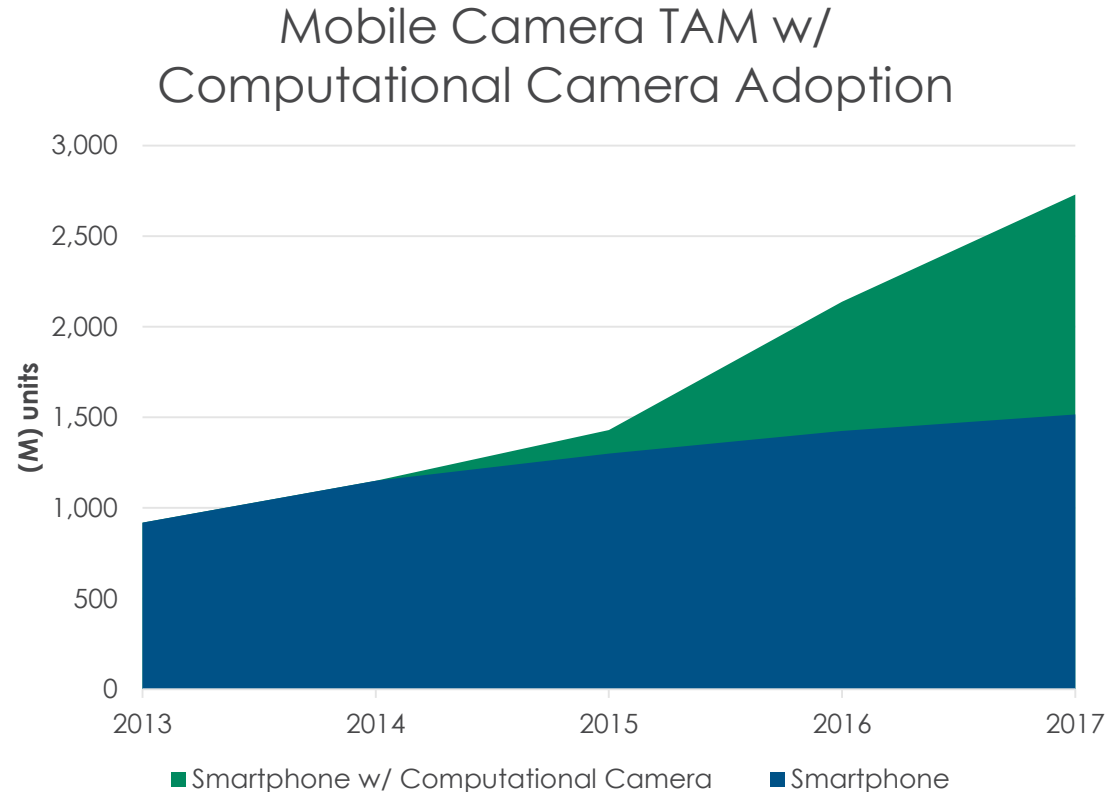
Note: CAGR is calculated for the period between 2015 and 2020.
Source: Secondary Literature, Experts' Interviews and Markets and Markets Analysis

"The growth of the market is propelled by the exponential growth in the consumer electronics application market; especially owing to the growing demand for devices such as cameras, smartphones, and tablets."

Source, Markets and Markets Global Forecast 2014 - 2020

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GROWING MARKET: COMPUTATIONAL CAMERAS

Mobile Camera TAM w/ Computational Camera Adoption

(M) units

3,000
2,500
2,000
1,500
1,000
500
0

2013   2014   2015   2016   2017

■ Smartphone w/ Computational Camera   ■ Smartphone

"Mobile Devices Will Either Have 3D Sensors or Suffer Flat Sales…"

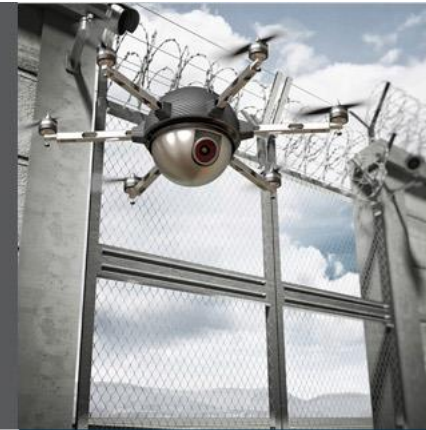TechCrunch, September 9, 2015

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KEY MARKETS DRIVE ADOPTION

PC / LAPTOP

ROBOTICS

MEDICAL

MOBILE PHONE

AUTOMOTIVE

SECURITY & SURVEILLANCE

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GROWING NUMBER OF CONSUMER USE CASES FOR 3D IMAGING

AVATAR PERSONALIZATION

3D SELFIE

E-COMMERCE SCANNING FOR THE PERFECT FIT
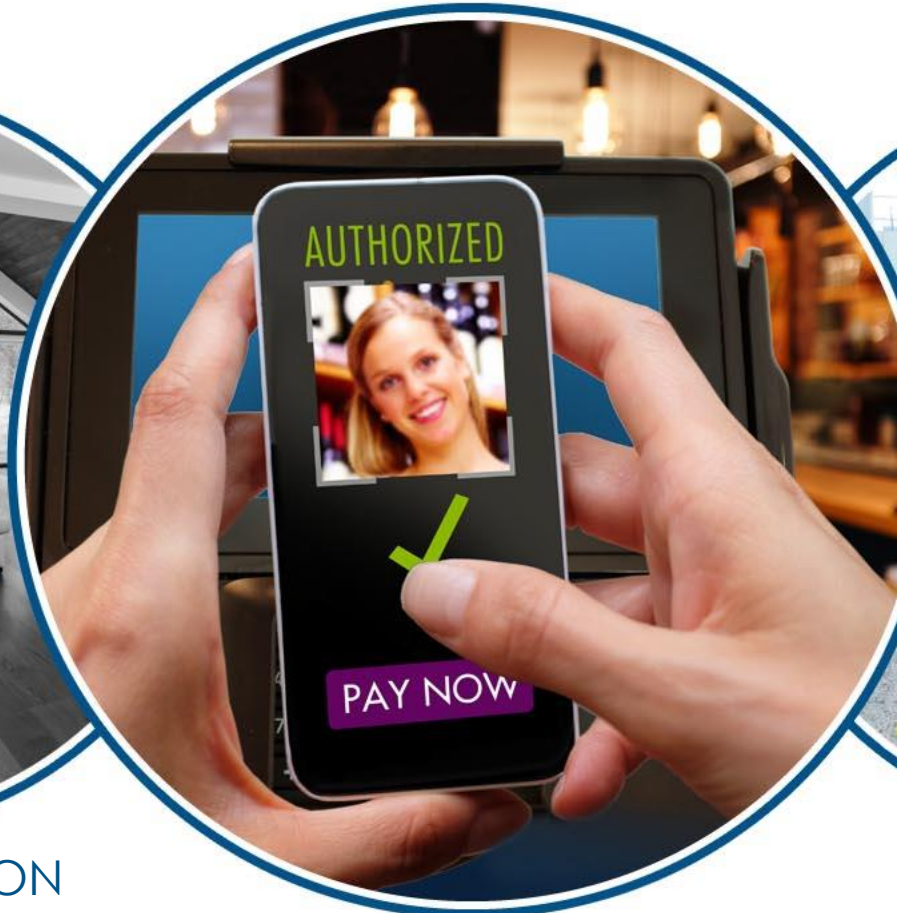
3D PRINTING

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SECURITY APPLICATIONS FOR 3D SENSING

OBJECT PLACEMENT IN PUBLIC SPACES
(Ex: backpack left behind)

OBJECT DETECTION CONNECTED HOME
(Ex: reducing false positives)

AUTHORIZED

PAY NOW

MOBILE BANKING
(Ex: facial recognition/ authorization)

WALK-THROUGH SECURITY SCANNING
(Ex: detect presence, position, volume)

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AUTOMOTIVE 3D SENSOR/LIDAR APPLICATIONS

DISTRACTED/FATIGUED DRIVER DETECTION

SITUATIONAL AWARENESS

SECURITY & AUTHENTICATION

SEAT & AIR BAG ADJUSTMENTS

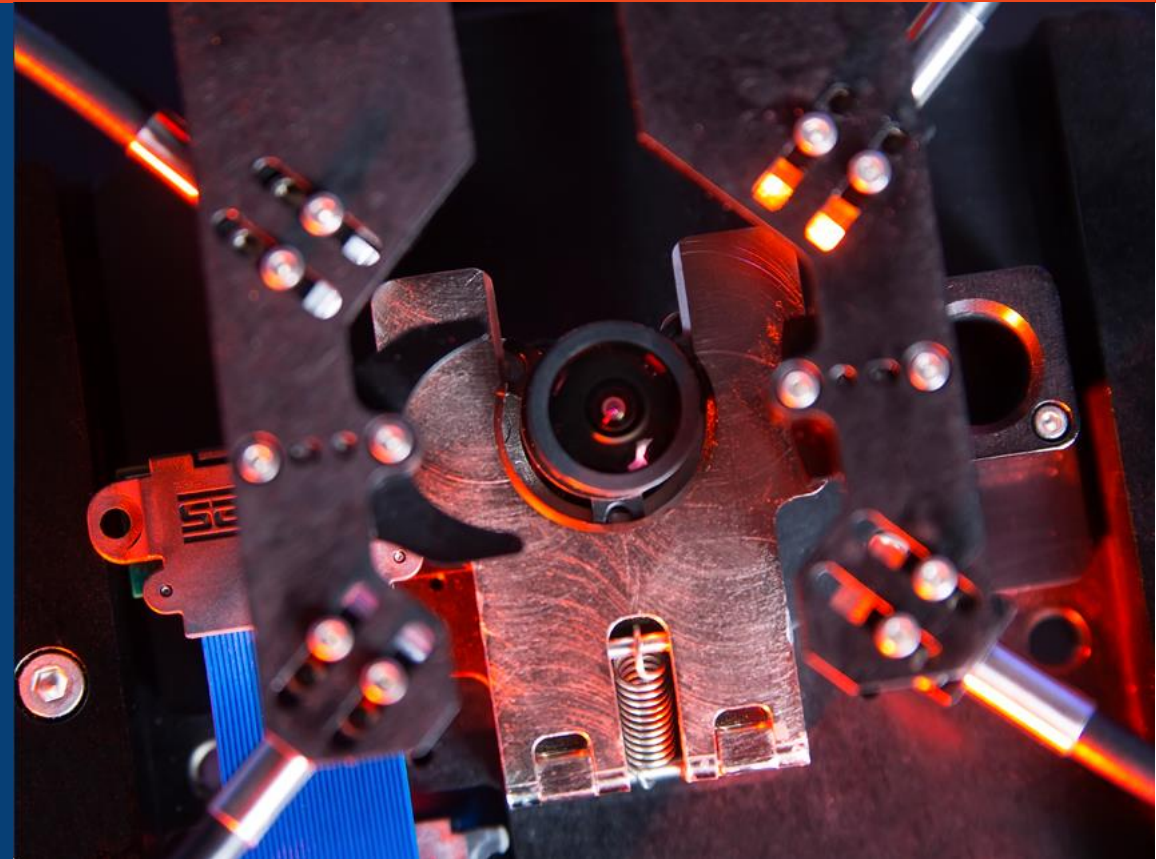SMART HEADLAMPS

HEAD-UP DISPLAY

GESTURE RECOGNITION

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ACTIVE ALIGNMENT FOR MINIATURIZATION

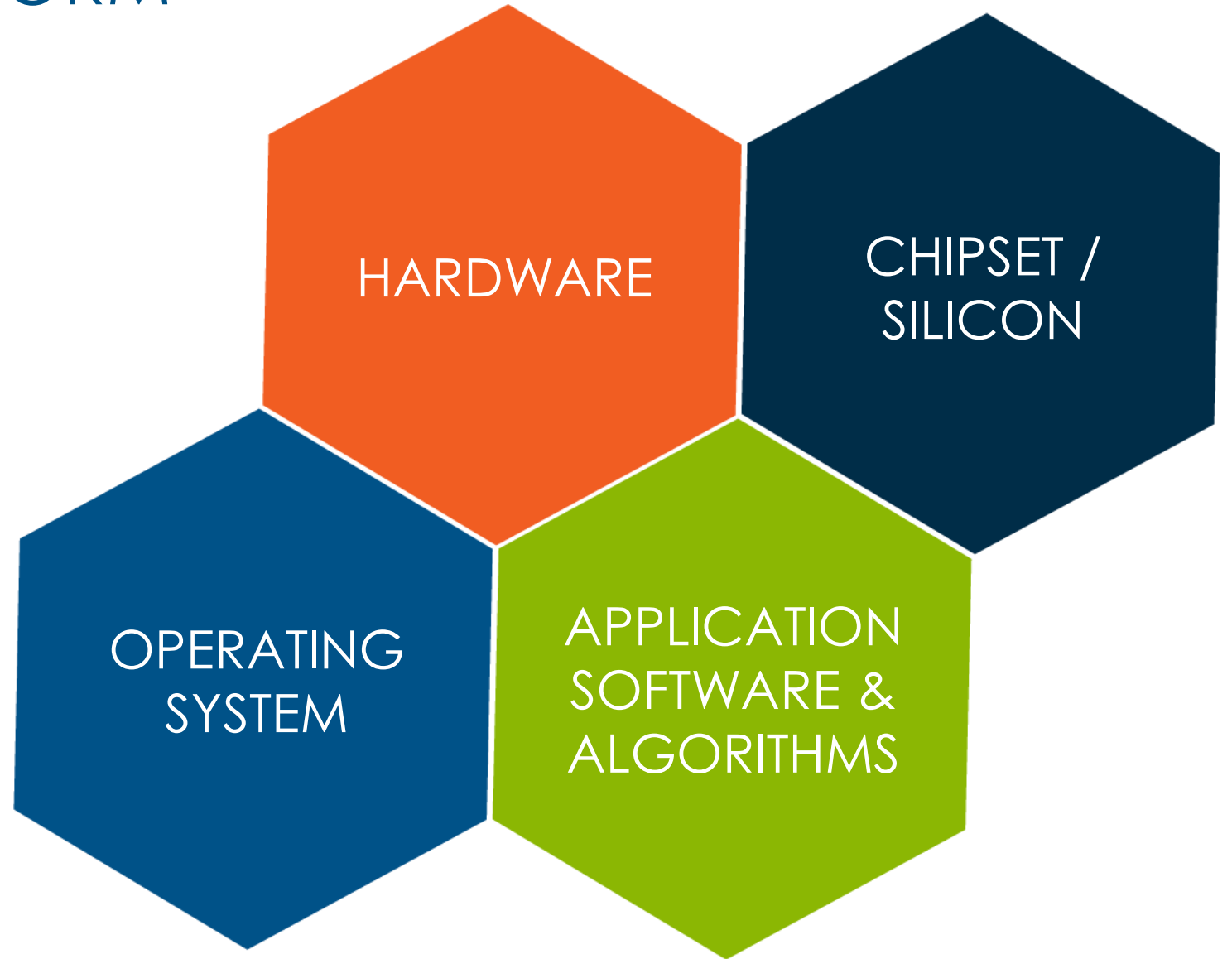## Maximum precision for better performance and yield.

TECHNOLOGY DEMANDS

- New devices more difficult to manufacture
- Lens must be closer to active device
- Larger aperture lens required
- Decreasing pixel pitch
- Multi-lenses (array, 3D)
- Vision analysis requirements
- Clean manufacturing environment
- CMs and OEMs must differentiate to increase margins
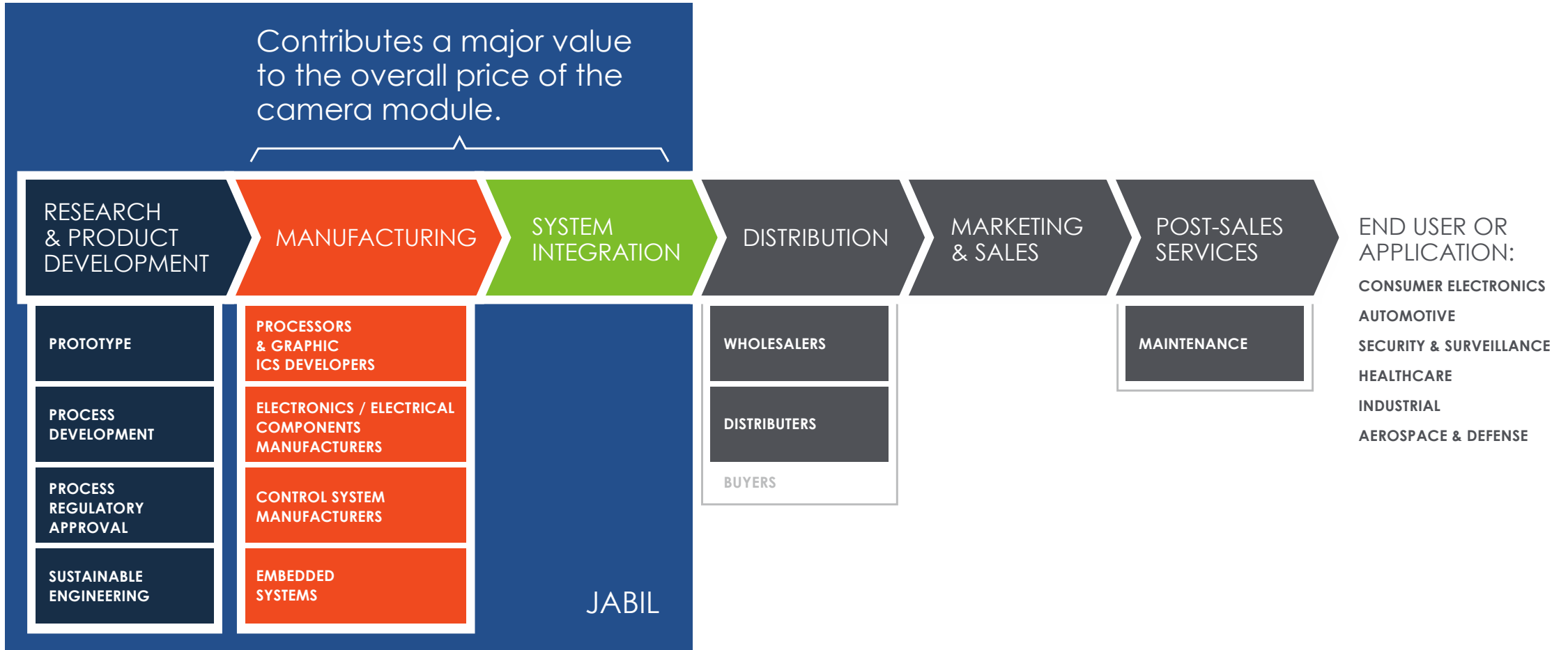
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VALUE OF THE PLATFORM

By partnering with leaders across the ecosystem, Jabil Optics is part of a comprehensive platform strategy.

HARDWARE

CHIPSET / SILICON

OPERATING SYSTEM

APPLICATION SOFTWARE & ALGORITHMS

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JABIL ADDS VALUE DURING MANUFACTURING

Contributes a major value to the overall price of the camera module.

RESEARCH & PRODUCT DEVELOPMENT	MANUFACTURING	SYSTEM INTEGRATION	DISTRIBUTION	MARKETING & SALES	POST-SALES SERVICES	END USER OR APPLICATION:

RESEARCH & PRODUCT DEVELOPMENT
- PROTOTYPE
- PROCESS DEVELOPMENT
- PROCESS REGULATORY APPROVAL
- SUSTAINABLE ENGINEERING

MANUFACTURING
- PROCESSORS & GRAPHIC ICS DEVELOPERS
- ELECTRONICS / ELECTRICAL COMPONENTS MANUFACTURERS
- CONTROL SYSTEM MANUFACTURERS
- EMBEDDED SYSTEMS

JABIL

DISTRIBUTION
- WHOLESALERS
- DISTRIBUTERS

BUYERS

POST-SALES SERVICES
- MAINTENANCE

END USER OR APPLICATION:
- CONSUMER ELECTRONICS
- AUTOMOTIVE
- SECURITY & SURVEILLANCE
- HEALTHCARE
- INDUSTRIAL
- AEROSPACE & DEFENSE

JABIL OPTICS

D3 – DESIGN, DEVELOPMENT, & DEPLOYMENT

DESIGN		DEVELOPMENT		DEPLOYMENT		FASTER TIME TO MARKET
Optical, mechanical, and electronic parts design and validation	+	Process development and validation to assemble designed parts	+	Lean Six Sigma-based manufacturing of designed and developed solutions	=	INCREASED YIELD MAXIMUM PRECISION

JABIL OPTICS

BROAD SCOPE OF CUSTOMER EXPERIENCE

JABIL HAS PROVIDED	FULL PRODUCT DESIGN	OPTO-MECHANICAL DESIGN	DEVELOPMENT & INTEGRATION	INDUSTRIALIZATION DEPLOYMENT	MASS / SERIAL PRODUCTION, HIGH PRECISION ASSEMBLY DEPLOYMENT

FOR	CAMERA MODULES INCLUDING ULTRA-COMPACT, HIGH RES	PROJECTORS	3D SENSORS	SCANNERS INCLUDING THERMAL, BAR CODE	AR & VR INCLUDING COMPACT WEARABLES

JABIL
OPTICS

GLOBAL OPERATIONS
FOR INNOVATION, DESIGN, & EXCELLENCE

San Jose, USA

Burlington, USA

Jena, Germany

Opening in September 2017

Haifa, Israel

Huangpu, China

PROCESS DEVELOPMENT	ACTIVE ALIGNMENT	PRODUCT DESIGN	MANUFACTURING ENGINEERING
• Advanced process solutions	• Active alignment	• World class optics design	• Design & procurement of optical lens assemblies and sub-assemblies
• Optimal material and component selection	• Precision Components Placement	• Electrical engineering	• New product introduction
• Customized adhesive solutions	• Lens assemblies	• Design for high-volume manufacturing	• High-volume production of optical solutions
• Equipment guidance and selection	• Gluing technologies	• Design to cost	• Final goods assembly
	• Chip-on-board, Chip-on-flex,		• Test
	• Chip-on-stiffener, FlipChip		• Pack-out
	• Wire-bonding and ACF bonding		
	• Assembly Automation		

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THANK YOU

Jabil Optics — Building the vision with embedded optical solutions.

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