ALICE VENTURES

ECOSYSTEM INTELLIGENCE REPORT

Who Owns the ADAS Stack in 2026?

OEM vs. Tier-1 vs. Silicon vs. OS.

Power shift analysis across the autonomous driving stack.

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Prepared by: Alice Ventures

EXECUTIVE SUMMARY

The Advanced Driver Assistance System (ADAS) stack has become the defining battleground of the automotive industry's software transition. Control over this stack — spanning sensors, compute silicon, operating systems, middleware, algorithms, and training data — determines not only product differentiation but the distribution of margin, IP, and long-term platform power across the value chain.

Our analysis maps ownership, dependency, and trajectory across each stack layer for major OEMs, Tier-1 suppliers, silicon vendors, and OS platforms. The central finding: the stack is fracturing. What was once a coherent supplier-to-OEM delivery model is now a multi-polar contest in which silicon vendors are ascending, traditional Tier-1s are being disintermediated at the algorithm layer, and OEMs are bifurcating between those that can own their stack and those that cannot.

Key Findings

> Silicon is the new leverage point. Nvidia, Mobileye, and Qualcomm have become structurally indispensable to ADAS capability. OEMs without proprietary compute are dependent on silicon vendor roadmaps for competitive advancement.

> QNX is under existential siege. BlackBerry QNX's ADAS near-monopoly is eroding. Linux-based stacks and Android Automotive are gaining safety credentials, fragmenting the OS layer for the first time in a decade.

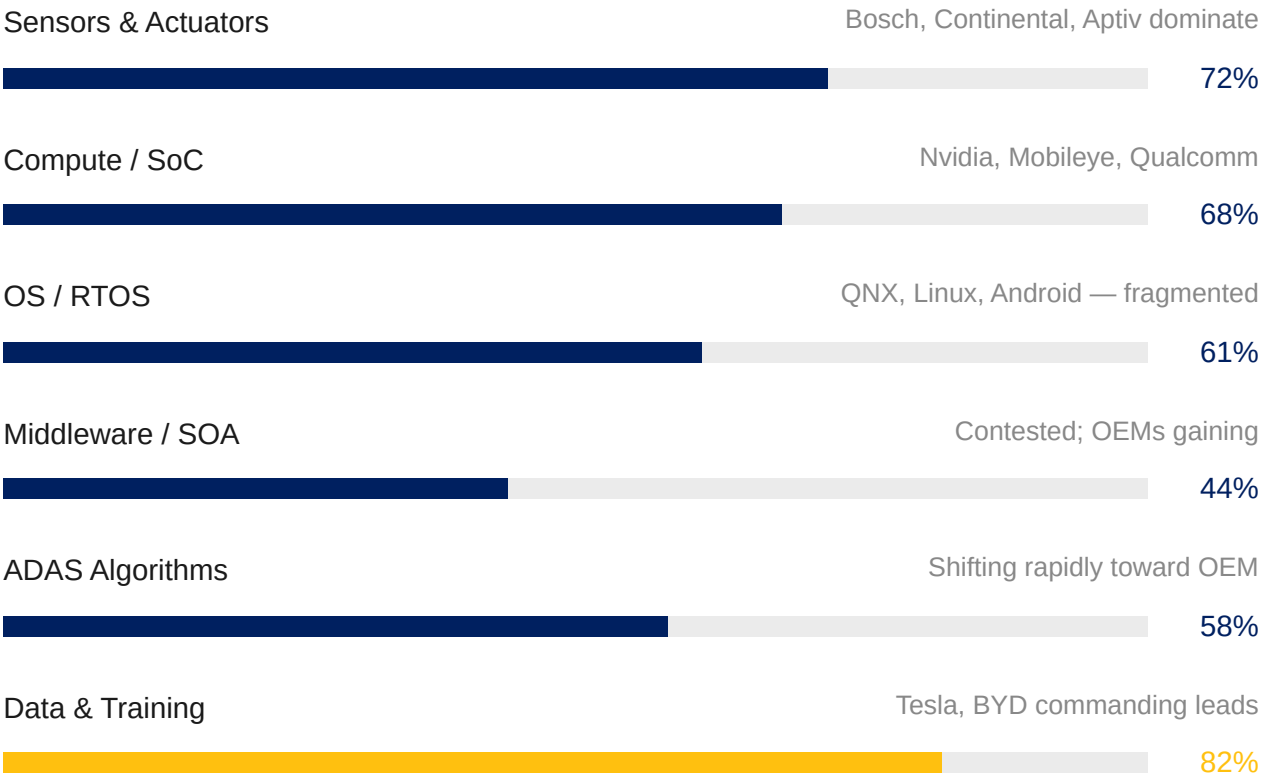
> Tier-1 algorithmic control is collapsing. Bosch, Continental, and Aptiv retain hardware dominance but are being bypassed at the algorithm and data layers by OEM-controlled software stacks and silicon vendor SDKs.

> Data ownership is the ultimate moat. Tesla's 5M+ fleet and BYD's data infrastructure represent compounding advantages in ADAS training that cannot be replicated through capital investment alone.

> OEM bifurcation is complete. SDV-native OEMs own 60–80% of their ADAS stack. Legacy OEMs own 15–30%, with critical dependency at every layer. This structural gap widens with each model cycle.

Stack Layer Control — Current State (2026)

Percent of value chain controlled by the dominant actor at each layer.



Gold bar = dominant concentration ≥80%, indicating platform-level control. Source: Alice Ventures assessment, 2026.

> The pattern of control is not random. Layers carrying compounding data advantages (Data & Training) and ecosystem lock-in (Compute, Sensors) concentrate fastest. Layers without these properties (Middleware, Algorithms) remain contested. The trajectory of contestation across all six layers is the substance of the report that follows.

I. THE ADAS STACK: ARCHITECTURE & LAYERS

Defining the Competitive Domain

The ADAS stack is a vertically integrated system of six interdependent layers. Control at any single layer creates leverage — or dependency — across the entire stack. The power shift occurring in 2024–2026 is not uniform: different actors are advancing at different layers simultaneously, replacing traditional supply chain hierarchy with a multi-polar contest.

Understanding who controls each layer — and the trajectory of that control — is the analytical foundation for assessing competitive position across OEMs, Tier-1s, silicon vendors, and OS platforms.

ADAS STACK LAYER ARCHITECTURE

01	**Sensors & Actuators** Cameras, radar, lidar, ultrasonic, V2X modules, steering / braking actuators. Physical perception layer.	Tier-1 Suppliers	HIGH
02	**Compute Platform (SoC)** Centralized AI inference chips, GPU clusters, NPUs. The arithmetic engine of ADAS.	Silicon Vendors	DOMINANT
03	**Operating System / RTOS** Real-time OS providing hardware abstraction, scheduling, and safety-certified runtime.	OS Platforms	CONTESTED
04	**Middleware & SOA** AUTOSAR Adaptive, ROS2, proprietary middleware connecting applications to hardware.	OEM + Tier-1	TRANSITIONING
05	**ADAS Algorithms** Perception, sensor fusion, prediction, planning, and control software — the core intelligence.	Fragmented	SHIFTING TO OEM
06	**Data & Training** Fleet pipelines, labeling, model training, simulation, and continuous improvement loops.	OEM (SDV-native)	BIFURCATED

Why Layer Control Matters

Layer ownership is not just a procurement decision; it determines which firm captures profit, which firm controls product velocity, and which firm accumulates the data that defines next-generation capability. Three structural mechanisms drive this asymmetry.

Margin Capture

Software and data layers carry 60–80% gross margins vs. 8–12% for hardware. Layer ownership determines profit pool allocation across the value chain.

Roadmap Control

Dependency on external layer owners subjects OEMs to partner timelines, API changes, and feature prioritization they cannot influence — even when those decisions affect their own product cycles.

Data Leverage

Higher-layer owners capture behavioral and training data — the compounding asset that widens capability gaps over time. Without layer control, OEMs cannot accumulate this leverage.

> Analytical Framework. Each of the following sections analyzes one actor class — OEMs, Tier-1 suppliers, silicon vendors, and OS platforms — assessing their current control position, directional trajectory, and strategic vulnerability at each stack layer.

The order of analysis is deliberate. We begin at the OEM layer because OEM bifurcation is the loudest signal in the data; the contest at every other layer is partly a consequence of which OEMs can buy and which must build. Silicon, OS, and Tier-1 dynamics are interpreted in that context.

II. OEM CONTROL — VERTICAL INTEGRATION VS. DEPENDENCY

OEMs sit at the top of the vehicle value chain — but in ADAS, that position is increasingly nominal. The key differentiator in 2026 is depth of proprietary stack ownership. SDV-native OEMs have transformed into software companies with manufacturing capabilities. Legacy OEMs remain manufacturing companies with software ambitions.

OEM Stack Ownership by Layer (% Proprietary Control)

OEM	Sensors	Compute	OS	Middleware	Algorithms	Data	Tier
Tesla	95%	90%	88%	92%	97%	98%	NATIVE
BYD	70%	75%	72%	68%	82%	85%	NATIVE
NIO	65%	70%	68%	72%	80%	78%	NATIVE
VW Group	35%	30%	28%	38%	42%	25%	FOLLOWER
Mercedes-Benz	30%	25%	32%	35%	48%	22%	FOLLOWER
GM	28%	22%	25%	30%	40%	28%	FOLLOWER
Toyota	20%	15%	18%	20%	22%	15%	LAGGER
Stellantis	18%	12%	14%	16%	18%	12%	LAGGER

Gold (≥80%) = dominant proprietary control. Grey (<30%) = structural dependency. Source: Alice Ventures assessment.

> The bifurcation is structural, not transitional. SDV-native OEMs (Tesla, BYD, NIO) operate with proprietary control averaging 75–95% across all six layers. Legacy OEMs operate at 20–40% across the same layers, with no credible roadmap to close the gap within current capital cycles.

II. OEM CONTROL (continued)

Strategic Positions — Selected OEMs

Tesla FULL-STACK OWNER

Tesla is the only OEM with credible proprietary control at every stack layer. The HW4.0 compute platform — designed in-house at 250+ TOPS — eliminates Mobileye and Nvidia dependency entirely. Tesla's custom Dojo supercomputer provides independent training infrastructure. With FSD v12 operating on end-to-end neural networks trained on 5M+ fleet vehicles, Tesla's data-algorithm flywheel is functionally irreproducible.

> Strategic Position. Tesla is not an automotive company competing in ADAS — it is an AI company that sells vehicles to generate training data. This inversion places it in a structurally different competitive category.

Volkswagen Group TRANSITIONING

VW's CARIAD unit was intended to deliver full-stack ADAS control by 2023. Delays have forced a hybrid position: Mobileye EyeQ chipsets underpin current-gen ADAS, while CARIAD develops next-gen software on Qualcomm Snapdragon Ride. The Rivian partnership adds a third architectural dependency.

> Strategic Position. VW is simultaneously dependent on Mobileye (current), Qualcomm (next gen), and Rivian (software platform) — multi-layer dependency with no clear path to proprietary control within this decade.

Toyota STRUCTURALLY DEPENDENT

Toyota Safety Sense 3.0 operates almost entirely on supplier-owned architecture: Denso sensors, Mobileye compute, QNX-based OS, and Continental middleware. Arene OS development targets 2026, but proprietary algorithm development remains nascent.

> Strategic Position. Toyota faces an architectural paradox: the most vehicles on the road, the least data control. Scale without software ownership produces volume without compounding advantage.

III. TIER-1 SUPPLIERS — STRUCTURAL POSITION

Traditional Tier-1 automotive suppliers built their ADAS positions over decades through sensor manufacturing, ECU integration, and safety certification. That foundation remains valuable — but the layer of value is migrating upward toward software and data faster than most Tier-1s can follow. Hardware control is strengthening while algorithmic control is collapsing.

The Disintermediation Thesis

LAYER CONTROL RETAINED

- Radar & camera hardware manufacturing
- Lidar module production & supply
- Safety-certified ECU hardware
- Physical integration & validation
- ASIL-D certification expertise

LAYER CONTROL ERODING

- Perception algorithm ownership
- Sensor fusion software
- Central compute / SoC design
- ADAS platform software integration
- Training data access & pipelines

Key Tier-1 Profile · Mobileye

Mobileye

Intel subsidiary — Jerusalem, Israel

OEM CUSTOMERS	UNITS SHIPPED	2025E REVENUE
50+	170M+	$2.1B

Mobileye occupies a unique position: simultaneously a Tier-1 supplier and silicon vendor, with its EyeQ SoC series forming the compute foundation for ADAS systems across 50+ OEMs. SuperVision and Drive-by-Wire represent a bid for full-stack autonomy delivery. The 2023 loss of BMW and portions of VW to in-house development demonstrates OEM dependency is not permanent.

> Trajectory. Mobileye retains near-term dominance in L2 / L2+ systems but faces displacement risk at L3+ as OEMs invest in proprietary perception software. Silicon layer remains defensible; software layer is contested.

Key Tier-1 Profiles · Bosch & Continental

Bosch

Private — Stuttgart, Germany

ADAS REVENUE	RADAR UNITS / YR	SW ENGINEERS
$8.4B	35M+	~40,000

Bosch is the world's largest automotive supplier and remains dominant in ADAS sensor hardware — particularly radar. With 35M+ radar units shipped annually, Bosch's hardware position is structurally entrenched. However, software capabilities have not kept pace. The company relies on Qualcomm and Nvidia compute and has not delivered a credible proprietary ADAS platform for L3+ applications.

> Trajectory. Repositioning as hardware-centric ADAS supplier for the volume OEM segment while conceding software ambitions at the algorithm layer. A defensible but margin-compressing position.

Continental

Listed — Hanover, Germany

ADAS REVENUE	CAMERA UNITS / YR	ADS DIVISION
$5.2B	22M+	Conti ADS

Continental has attempted the most ambitious Tier-1 software pivot through its Autonomous Driving & Safety division. The Elektrobit acquisition and ADCU domain controller platforms integrate third-party silicon (Nvidia Drive) with proprietary middleware — a middle-layer bet. Continental's approach is credible but capital-intensive against native software competitors.

> Trajectory. The middleware layer bet may provide durable positioning as a managed integration partner for legacy OEMs unable to build full-stack capability independently.

IV. SILICON LAYER — COMPUTE PLATFORM WARS

The compute silicon layer has become the most strategically contested position in the ADAS stack. Whoever controls the SoC controls the ceiling of system capability, the software API surface, and increasingly the development tools, simulation environments, and training pipelines that OEMs depend on. Silicon vendors have ascended from component suppliers to platform gatekeepers.

The Platform Gatekeeper Dynamic

01

Compute Ceiling

TOPS capacity determines the complexity of neural networks an OEM can run. Platform selection binds OEM capability for 5–7 year vehicle cycles.

02

SDK Lock-in

CUDA, Mobileye's SDK, and Qualcomm's AI Stack create ecosystem dependency. Engineering teams build workflows and tools around specific silicon APIs.

03

Safety Certification

ISO 26262 ASIL-D certification requires 18–24 months. OEMs cannot switch vendors within a generation — switching costs are prohibitive.

ADAS Compute Market — Vendor Share & Platform Landscape (2026E)

Vendor	Lead Platform	Peak TOPS	Key OEM Customers	Mkt Share	Trajectory
Nvidia	Drive Thor / Orin	2,000 / 254	Mercedes, BYD, Volvo, Rivian, Li Auto	38%	ASCENDING
Mobileye	EyeQ6 / EyeQ Ultra	176 / 176×3	50+ OEMs (Toyota, GM, Ford, VW current gen)	29%	DEFENDING
Qualcomm	Snapdragon Ride Elite	700	VW (next gen), BMW, GM, Honda	16%	ASCENDING
Tesla	HW4.0 (internal)	250+	Tesla only	9%	PROPRIETARY
Horizon Robotics	Journey 6	560	BYD, SAIC, Great Wall (China)	5%	REGIONAL
Other	Various	—	Ambarella, TI, NXP	3%	NICHE

TOPS = Tera Operations Per Second. Market share estimated by units shipped. Source: Alice Ventures analysis.

Strategic Profiles — Key Silicon Vendors

Nvidia — The Ascending Platform

Nvidia Drive Thor (2,000 TOPS) represents a generational leap over competing platforms. More strategically important than raw compute is Nvidia's ecosystem: CUDA GPU programming, Omniverse simulation, DriveWorks SDK, and Isaac autonomous vehicle development toolkit. OEMs adopting Nvidia Drive do not simply buy a chip — they adopt a development platform deeply embedded in engineering workflows.

> Risk for OEMs. Nvidia's platform creates deep SDK lock-in. OEMs building ADAS algorithms on CUDA-based DriveWorks become structurally dependent on Nvidia's roadmap, pricing, and supply chain — a dependency not visible at design-in but binding 3–4 years later.

Mobileye — The Incumbent Under Siege

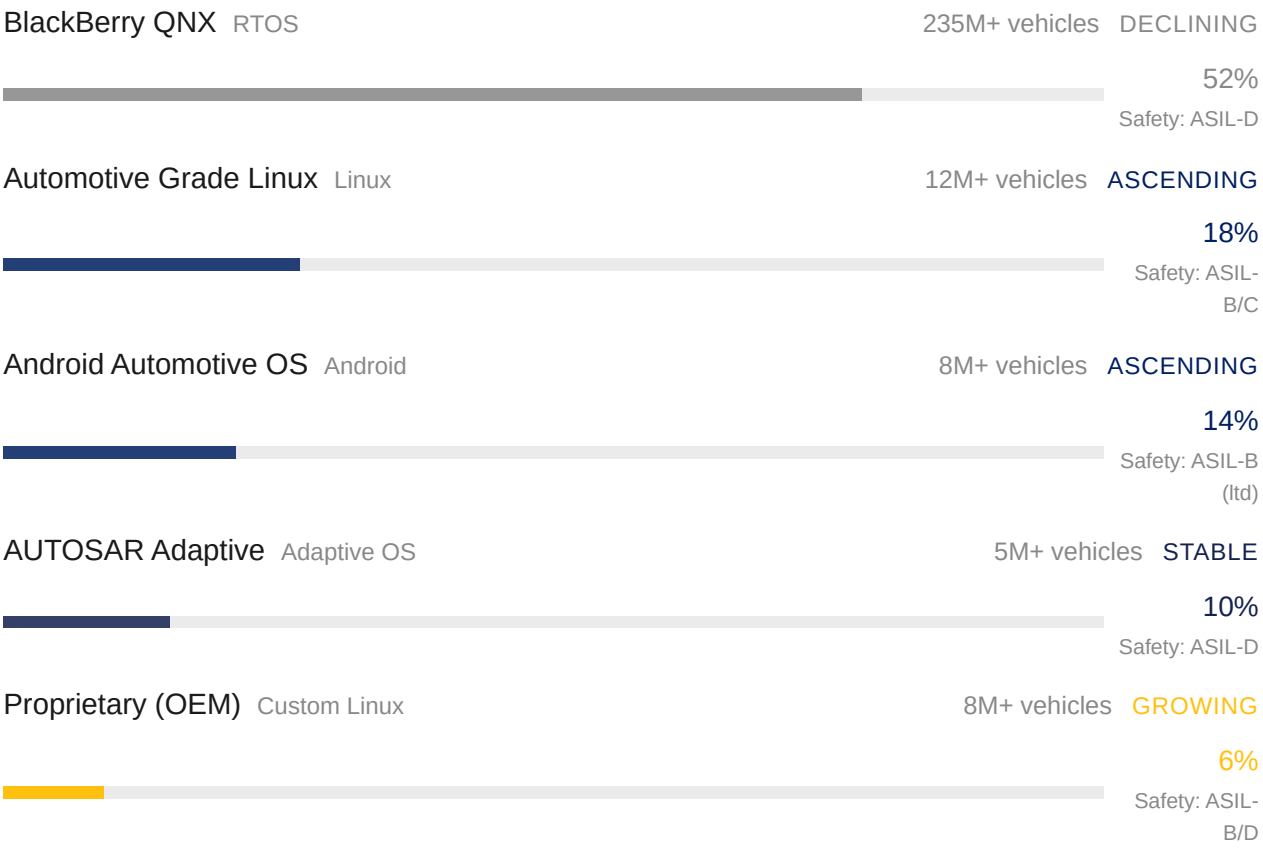
EyeQ series chips power the majority of production L2 ADAS systems globally — a deeply embedded position generating predictable revenue through 2028+ on existing contracts. However, EyeQ6 and EyeQ Ultra face compute performance disadvantages at the L3+ level vs. Nvidia Drive Thor. Mobileye's SuperVision (full-stack turnkey ADAS) is as much a defensive move against OEM in-house development as against competing silicon.

> Structural position. L2 installed base provides revenue stability through 2027–2028. L3+ competition is the existential question. If Nvidia captures the next-generation platform transition, Mobileye faces revenue cliff risk as current-gen contracts roll off.

V. OS LAYER — QNX, LINUX & ANDROID

The operating system layer is undergoing the most rapid power shift of any stack layer. BlackBerry QNX's decade-long near-monopoly in automotive RTOS is fragmenting under pressure from three directions: Linux-based stacks gaining safety certification, Android Automotive expanding beyond infotainment, and SDV-native OEMs building proprietary OS platforms eliminating external dependency entirely.

OS Platform Market — ADAS Deployments (2026E)



Market share by active ADAS system deployments, not infotainment. Source: Alice Ventures analysis.

Platform Analysis

BlackBerry QNX — The Incumbent Fading

QNX's position rests on unmatched ASIL-D safety certification, 235M+ deployed vehicles, and deep OEM integration across existing programs. For safety-critical ADAS functions — braking, steering intervention, L3 conditional automation — QNX remains the regulatory default in most markets.

Vulnerability. QNX is not cloud-native, not developer-friendly, and not built for continuous deployment. As ADAS algorithms require more frequent updates, QNX's microkernel architecture becomes a bottleneck. BlackBerry's financial weakness limits R&D investment to maintain competitive parity.

Platform Analysis (continued)

Automotive Grade Linux (AGL) — The Challenger

AGL, backed by the Linux Foundation with Toyota, Renault, and Subaru, is gaining ASIL-B / C certification and expanding from infotainment into ADAS-adjacent domains. The open-source model provides development velocity and ecosystem breadth that proprietary RTOS platforms cannot match.

Limitation. AGL's ASIL-D certification gap remains a barrier for the most safety-critical ADAS functions. Full L3+ requires mixed-OS architectures (Linux for perception + QNX for safety-critical control) — adding integration complexity that offsets cost savings.

Android Automotive OS (AAOS) — The Trojan Horse

Google's AAOS has crossed from infotainment into ADAS-adjacent territory through Google Maps (routing, hazard data), Google Assistant (voice-commanded ADAS), and emerging APIs connecting vehicle sensor data to cloud processing. Deployed across Volvo, Polestar, Renault, GM, and Honda.

Strategic implication. AAOS represents Google's most credible automotive wedge. OEMs adopting AAOS for infotainment are laying groundwork for Google's expansion into ADAS data flows — a strategic dependency not visible at the point of adoption.

> The OS layer's fragmentation is the most consequential development in the ADAS stack. Whoever owns the OS owns the device API, the safety boundary, and increasingly the data egress channel. The next 36 months will determine whether QNX retains safety-critical control, whether Linux achieves L3+ certification, or whether OEM-proprietary OS development closes external access entirely.

VI. POWER SHIFT ANALYSIS

Synthesizing the preceding layer-by-layer analysis, four major power shifts are occurring simultaneously. These shifts are observable in design win announcements, OEM organizational restructuring, supplier margin compression, and capital allocation disclosures across the industry.

Power Distribution Matrix — ADAS Stack Control (2026E)

Stack Layer	OEM	Tier-1	Silicon	OS Platform	Trajectory
Sensors & Hardware	15%	78%	12%	0%	→ → Tier-1 Stable
Compute / SoC	8%	18%	74%	0%	↑ Silicon Ascending
OS / RTOS	10%	5%	8%	77%	↕ OS Fragmenting
Middleware / SOA	38%	35%	10%	17%	↑ OEM Gaining
ADAS Algorithms	46%	28%	18%	8%	↑ OEM Rapidly
Data & Training	72%	12%	14%	2%	↑ OEM Dominant

Values = estimated % of control held by each actor class per layer. Gold = dominant control (≥70%).

The Four Active Power Shifts

01 Tier-1 Suppliers → Silicon Vendors Compute Platform RAPID

AI compute demands exceed what traditional ECU suppliers can deliver. Nvidia and Mobileye captured design wins that previously went to Bosch and Continental ECU platforms.

02 QNX Monopoly → Multi-OS Landscape Operating System GRADUAL

Linux safety certification progress, Android Automotive proliferation, and OEM proprietary development are collectively eroding QNX's share from 65%+ (2020) toward 52% (2026) and declining.

03 Tier-1 Algorithm Ownership → OEM In-House / Silicon SDK ADAS Algorithms ACCELERATING

SDV-native OEMs have demonstrated that proprietary perception and planning delivers better performance than Tier-1-supplied black boxes. Traditional OEMs are following suit with variable success.

04 Hardware-Defined Features → Software-Defined, OTA Full Stack BIFURCATED

SDV-native OEMs operate on 2–6 week software delivery cycles. Traditional OEMs tied to hardware refresh cycles cannot participate in continuous ADAS improvement loops.

Net Beneficiaries & Net Losers by 2028

The simultaneous power shifts create a structural sorting of winners and losers. The cycle is no longer about who builds the best ADAS feature; it is about who controls the layer where value compounds. The trajectories below are observable today and accelerate through the forecast horizon.

NET BENEFICIARIES

- Nvidia — platform ascendancy at compute layer
- Tesla / BYD — data & algorithm compounding
- Qualcomm — fast-follower OEM design wins
- AGL / Linux ecosystem — OS share gains
- OEM software units — if execution improves

NET LOSERS

- BlackBerry QNX — OS share erosion inevitable
- Bosch, Continental — algorithm disintermediation
- Mobileye — L3+ compute displacement risk
- Legacy OEMs (Toyota, Stellantis) — deepening dependency
- Dedicated ADAS ECU makers — central compute obsolescence

> The dispersion is widening, not converging. By 2028, the top quartile and bottom quartile of ADAS stack control will diverge sharply enough to produce different equity multiples. This is the practical case for treating "automotive equity" as a sector composed of two valuation regimes rather than one.

VII. STRATEGIC IMPLICATIONS

For Investors

ADAS stack ownership analysis fundamentally changes how automotive equities should be evaluated. Traditional metrics — production volume, dealer network, brand equity — are lagging indicators. Leading indicators are now: proprietary stack depth, data asset scale, silicon dependency, and software revenue trajectory.

LONG: SILICON-TO-SOFTWARE PLATFORMS

- Nvidia — inevitable platform winner if Drive ecosystem captures L3+ design wins
- OEMs with proprietary full-stack (Tesla, BYD) — value as technology platforms
- Qualcomm — fast-follower beneficiary of VW, BMW, GM next-gen ADAS programs

SHORT / AVOID: STRUCTURAL DEPENDENCY

- Traditional Tier-1s lacking credible algorithm / software strategy
- Legacy OEMs with >70% external stack dependency and no credible in-house roadmap
- BlackBerry — OS share erosion structurally unavoidable

Key Valuation Indicators

Indicator	Signal	Threshold (Positive)
Proprietary silicon adoption	OEM investing in custom SoC vs. buying off-shelf	Any in-house silicon program initiated
Algorithm IP ownership %	Share of ADAS algorithms developed internally	>50% by 2027
OTA update frequency	ADAS feature deployment cadence	Monthly+ deployment cycles
Data pipeline scale	Connected vehicle fleet as % of total	>60% fleet connected with closed-loop training
Software revenue growth	ADAS / subscription as % of total revenue	>10% by 2027 for legacy OEMs

VII. STRATEGIC IMPLICATIONS (continued)

For OEMs — The Make vs. Buy Decision

Every OEM faces a strategic decision at each layer: invest to own, partner to access, or accept dependency. Internal development requires 4–6 years to deliver competitive capability; partnership accelerates deployment but surrenders control; dependency is low-cost short-term but compounds as a strategic liability.

OWN (INVEST)

SDV-Native OEMs

All layers

Highest capital, 4–6 year runway. Maximum long-term control. Viable only for OEMs with scale and software talent density.

PARTNER (ACCESS)

Fast Followers

Silicon + OS; own algorithms

Moderate capital, 2–3 year deployment. Retains algorithm and data control. Accepts hardware layer dependency.

ACCEPT (BUY)

Structural Laggers

Full stack from Tier-1

Lowest initial capital, highest long-term cost. Capability ceiling bounded by supplier roadmaps.

For Tier-1 Suppliers — Repositioning Imperatives

The traditional Tier-1 business model — owning sensor, ECU, and algorithm as an integrated system — is structurally obsolete at higher stack layers. Three viable repositioning strategies exist:

01 **Hardware Excellence**

Dominate sensor manufacturing, physical integration, and safety-certified hardware. Accept algorithm layer disintermediation. Bosch's de facto trajectory.

02 **Middleware Integration**

Become the managed integration layer between silicon and OEM algorithms. Continental's ADCU platform strategy. Viable if OEMs cannot develop this layer independently.

03 **Full-Stack for Laggers**

Provide complete ADAS stack as managed service to legacy OEMs. Mobileye's SuperVision program is the purest expression. Requires capital and credible L3+ delivery.

VIII. OUTLOOK & SCENARIOS

SCENARIO PROBABILITY DISTRIBUTION (2026–2030)

BASE CASE

Continued Fragmentation (55% Probability)

The ADAS stack continues to fracture along layer lines through 2030. No single actor achieves full-stack dominance outside of SDV-native OEMs. Nvidia consolidates the L3+ compute layer. QNX retains safety-critical OS functions while Linux expands in non-safety domains. Tier-1s retreat to hardware excellence as OEMs develop algorithms in-house with varying success.

Nvidia

Captures 50%+ of L3+ compute design wins by 2028

QNX

Stabilizes at 35–40% share in safety-critical functions only

Bosch / Continental

Margin compression continues; hardware efficiency focus

Legacy OEMs

Deepening dependency on Nvidia + Linux + Tier-1 middleware

> Why this is the central path. The base case carries 55% probability because the structural forces driving fragmentation — silicon ascendancy, OS divergence, OEM bifurcation, algorithmic disintermediation — are independent and compounding. Reversal would require coordinated reversal across all four, which has no observable catalyst.

VIII. OUTLOOK & SCENARIOS (continued)

BULL CASE Platform Consolidation (28% Probability)

One or two platforms achieve dominance across multiple ADAS stack layers, creating ecosystem lock-in comparable to iOS / Android in mobile. Most probable consolidator: Nvidia, if Drive Thor + DriveWorks captures L3 design wins across fast-follower OEMs while onboarding third-party algorithm developers to its simulation infrastructure.

- Catalyst: Major OEM consortium adopts Nvidia Drive as common platform, signaling end of custom silicon competition
- Catalyst: AGL achieves full ASIL-D certification, enabling complete Linux-based stack and QNX displacement
- Implication: Nvidia captures platform-level value; OEMs differentiate on application layer only

> Investment implication. Nvidia equity upside case. Winner-takes-most dynamics in compute layer compress competitor valuations significantly.

BEAR CASE Regulatory Intervention (17% Probability)

A significant ADAS-related safety incident triggers prescriptive regulatory intervention in the OS and algorithm layers. Requirements for specific RTOS platforms (reinforcing QNX) or third-party algorithm validation mandates slow OEM in-house development and restore Tier-1 and OS vendor leverage.

- Catalyst: High-profile L3 failure attributed to OTA algorithm update causes multiple fatalities
- Catalyst: EU or NHTSA mandates certified third-party OS for all ADAS safety domains
- Implication: QNX certification lead re-entrenched; Mobileye certified system approach validated

> Investment implication. Reversal of disintermediation thesis. QNX and Mobileye benefit. OEM in-house software programs face regulatory headwinds. Tier-1s regain strategic relevance.

CENTRAL CONCLUSION

The question "who owns the ADAS stack" does not have a single answer in 2026 — and this is precisely the strategic reality. Ownership is layered, contested, and in motion. The actor class that successfully bridges multiple layers will capture disproportionate value. In 2026, that actor is Nvidia. By 2030, it could be Tesla — if its full-stack model becomes licensable, or if it achieves sufficient market share to define the competitive reference.

APPENDIX A · ADAS STACK CONTROL SCORING METHODOLOGY

Scoring Framework

Our proprietary ADAS Stack Control Index (0–100) scores each actor class across five dimensions. The framework measures actual proprietary ownership, not spending or declared intent. Scores are calibrated against observable evidence: product architectures, teardown analysis, OEM supply chain disclosures, and patent filings.

DIMENSION WEIGHTS

Hardware | Compute | OS & Middleware | Algorithm | Data

SCORING CRITERIA BY DIMENSION

Hardware & Sensor Control — 20 pts

Proprietary sensor design vs. commodity purchasing	0–8
ECU / domain controller manufacturing	0–7
ASIL-D safety certification ownership	0–5

Compute & Silicon — 20 pts

In-house SoC design vs. external silicon purchase	0–10
SDK / toolchain independence	0–6
Compute roadmap control	0–4

OS & Middleware — 20 pts

Proprietary OS or fork ownership	0–8
Middleware / SOA control	0–7
Safety runtime independence	0–5

Algorithm & Software — 25 pts

Perception algorithm IP ownership	0–10
Sensor fusion and prediction software	0–8
OTA deployment architecture	0–7

Data & Training — 15 pts

Connected fleet data access	0–6
Proprietary training infrastructure	0–5
Closed-loop improvement cadence	0–4

Evidence Sources

- Vehicle teardown and hardware architecture analysis
- OEM supplier and partner public disclosures
- Patent filing analysis (ADAS, autonomous driving)
- Software engineering headcount and team structure
- Regulatory and type-approval filings
- OEM and Tier-1 management interviews
- Proprietary supply chain research

Score Interpretation

The 0–100 index resolves to five classification bands. Each band carries distinct competitive implications and informs the Tier designation used throughout this report. Boundary cases are reviewed annually; scores are recalibrated against observed industry behavior to prevent definitional drift.

Score Range	Classification	Competitive Implication
80–100	Full-Stack Control	Proprietary ownership across all 5 dimensions. Compounding data and capability advantage. Example: Tesla (OEM).
60–79	Partial Control	Dominant at 2–3 layers, dependent at others. Credible SDV path but structural gaps present. Examples: BYD, NIO.
40–59	Transitioning	Material investment underway but significant external dependency remains. Execution risk high. Examples: VW Group, Mercedes.
20–39	Structurally Dependent	Multi-layer dependency with limited proprietary control. ADAS capability bounded by supplier roadmaps. Examples: Toyota, Stellantis.
0–19	Full Dependency	No meaningful proprietary ADAS stack elements. Effectively a Tier-1 customer for all capability.

> Interpretive note. Index scores reflect current observable position, not long-term outlook. A Transitioning OEM with a credible roadmap may outperform a Partial Control peer that has stalled. Index scores are best read alongside trajectory annotations in Sections II–VI of this report.

APPENDIX B · KEY PLAYER PROFILES

Nvidia Corporation

Silicon Vendor — Santa Clara, California, USA

ADAS REVENUE
$3.2B (2025E)

LEAD PLATFORM
Drive Thor / Orin

KEY OEM CUSTOMERS

Mercedes-Benz, BYD, Volvo, Rivian, Li Auto, Xpeng, NIO

STACK CONTROL POSITION

Compute (dominant), OS toolchain (partial), Algorithm SDK (growing)

STRATEGIC ASSESSMENT

The ascending gatekeeper of ADAS compute. Drive Thor's 2,000 TOPS positions Nvidia as the default L3+ platform for fast-follower OEMs. DriveWorks SDK creates deep engineering workflow dependency. Primary risk: OEM custom silicon programs (Tesla HW4, BYD joint platform) demonstrate viability of alternatives; Nvidia must retain developer ecosystem lead.

Mobileye Global Inc.

Silicon Vendor / Tier-1 Hybrid — Jerusalem, Israel (Intel subsidiary)

ADAS REVENUE
$2.1B (2025E)

LEAD PLATFORM
EyeQ6, EyeQ Ultra, SuperVision

KEY OEM CUSTOMERS

50+ OEMs including Toyota, GM, Ford, Volkswagen Group (current gen)

STACK CONTROL POSITION

Compute (L2 dominant, L3+ contested), Algorithm (partial via SuperVision)

STRATEGIC ASSESSMENT

Uniquely layered position as both silicon and software provider. EyeQ L2 installed base is durable through 2028 contracts. L3+ strategy hinges on SuperVision acceptance. Loss of BMW and portions of VW to in-house programs signals OEM willingness to disintermediate. Revenue cliff risk post-2028 if L3+ displacement occurs.

APPENDIX B · KEY PLAYER PROFILES (continued)

BlackBerry Limited (QNX)

OS Platform Provider — Waterloo, Ontario, Canada

ADAS REVENUE
$250M (2025E)

LEAD PLATFORM
QNX Neutrino RTOS, QNX Hypervisor

KEY OEM CUSTOMERS
235M+ vehicles deployed; BMW, VW, Toyota, Ford (existing programs)

STACK CONTROL POSITION
OS safety-critical domains (dominant, declining); hypervisor layer (stable)

STRATEGIC ASSESSMENT

ASIL-D certification heritage provides irreplaceable installed base through 2028. Long-term trajectory is structurally negative: Linux safety certification progress, AAOS expansion, and OEM proprietary OS development collectively erode the addressable market. QNX's most durable position is as a hypervisor platform coexisting with Linux guests — a narrower but certifiable niche.

Robert Bosch GmbH

Tier-1 Automotive Supplier — Stuttgart, Germany

ADAS REVENUE
$8.4B (2025E)

LEAD PLATFORM
iBooster, MRC, ADAS sensor portfolio

KEY OEM CUSTOMERS
Effectively all major global OEMs

STACK CONTROL POSITION
Sensors (high), Hardware (high), Algorithm (declining), Compute (minimal)

STRATEGIC ASSESSMENT

Bosch's ADAS franchise rests on sensor hardware supremacy — 35M+ radar units annually — and a safety-certified ecosystem built over three decades. Algorithm layer control is actively eroding as OEMs develop in-house perception and silicon vendors embed algorithm SDKs into compute platforms. Strategic response: accept algorithm disintermediation, invest in sensor differentiation, capture hardware volume from global ADAS proliferation.