arbe

Radar Revolution. Delivered.

The Time is Now:
Ultra-High Resolution Imaging Radar for True Road Safety and Autonomy

Disclaimer

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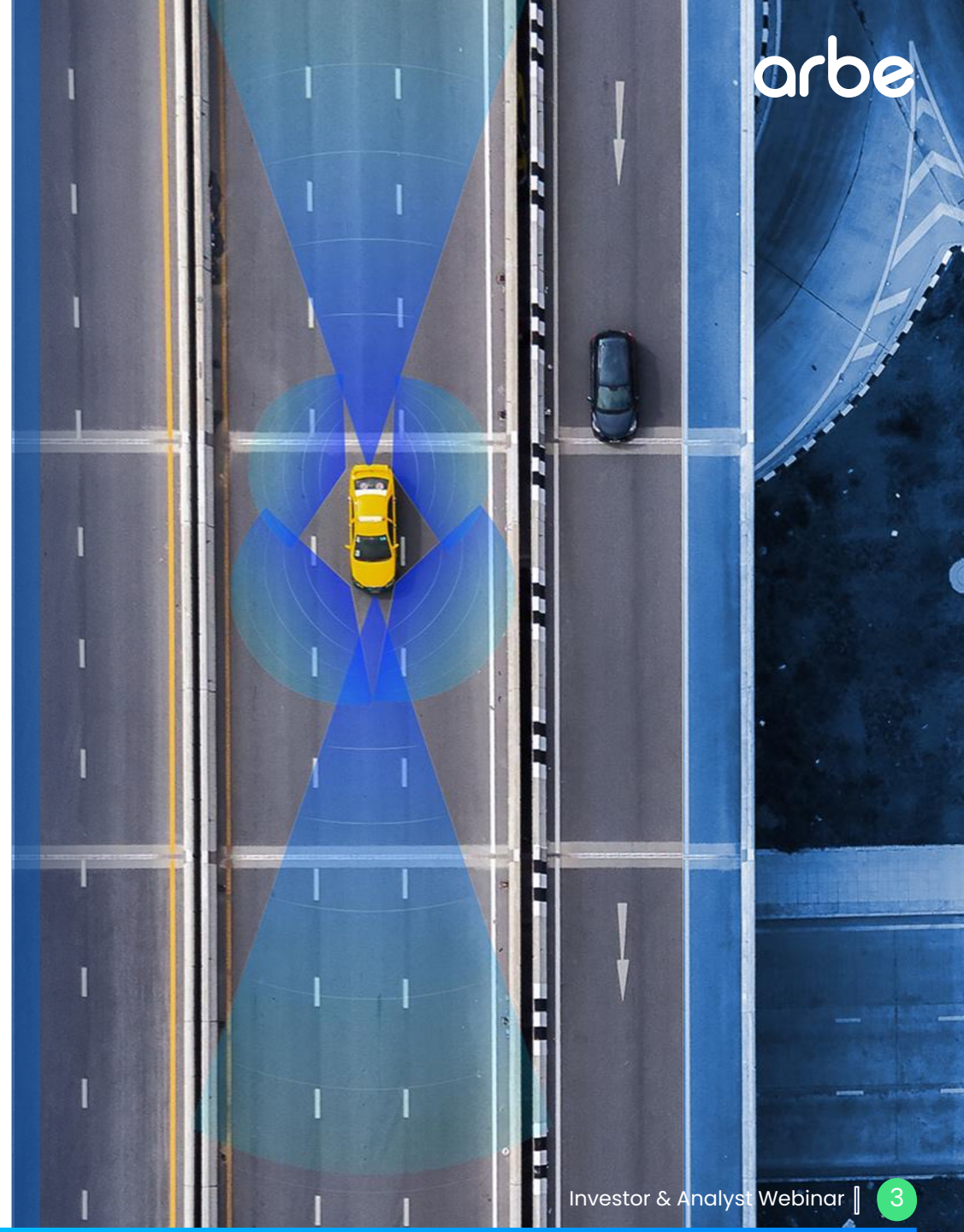
These risks and uncertainties include, but are not limited to: (i) unanticipated delays or difficulties in connection with the evaluation of Arbe's products in evaluation and test programs; (ii) the success of road pilot programs for Arbe's products, (iii) Arbe's ability to develop significant revenue as a result of the test programs involving its radar system and from customers who purchased Imaging Radar samples; (iv) Arbe's ability to leverage its existing relationships and secure test programs and orders resulting from the test programs; (v) Arbe's ability to meet its projected revenue level and its ability to operate profitably; (vi) Arbe’s ability to meet is timetable for full production; (vii) Arbe's expectation that it will be engaging with Tier 1 suppliers and OEMs which would be building the radars based on its Chipset solution, eliminating expenses associated with system completion, requirement for undertaking significant capital expenditures associated with developing mass production manufacturing and the expenses of operating any such manufacturing capability; (viii) the effect of inflation and supply chain issues on Arbe’s cost and its development schedule, including Arbe's ability to obtain semiconductor products when needed and at a reasonable price; (ix) Arbe's expectation that radars are crucial to the automotive industry and will be deployed in nearly all new vehicles as a long range, cost-effective sensor with the fewest environmental limitations; (x) Arbe's belief that the Arbe Radar Chipset heralds a breakthrough in radar technology that will enable Tier 1 manufacturers and OEMs to replace the current radars with an advanced solution that meets the safety requirements of Euro-NCAP and NHTSA for autonomous vehicles at all levels of autonomous driving; (xi) Arbe's ability to develop or have access to the latest developments relating to radar and autonomous driving vehicles; (xii) Arbe's ability to have products manufactured for it by third parties that meet Arbe's and its customers quality standards and delivery requirements; (xiii) Arbe's ability to attract and retain highly skilled personnel and senior management, including research and development, sales and marketing personnel; (xiv) Arbe's ability to develop and market products based on its radar technology for uses outside of the automotive industry; (xv) accidents or bad press resulting from accidents involving autonomous driving vehicles, even those using radar products from other companies or based on other technology; and the effect of any accidents with vehicles using Arbe's radar system; (xvi) the failure of the markets for Arbe's current or new technologies and products to materialize to the extent or at the rate that Arbe expects; (xvii) unexpected delays or difficulties related to the development of Arbe's technologies and products; (xviii) the effect of laws and changes in laws that have an effect on the market for or the requirement for autonomous vehicles; (xix) the effect of COVID-19 and any new variants or any pandemics or multinational epidemics and actions taken by governments and industry to address the effects of the pandemic and the corresponding macroeconomic uncertainty; (xvii) risks related to the potential impact of new accounting standards on Arbe's financial position, results of operations or cash flows; (xx) changes or inaccuracies in market projections; (xxi) changes in Arbe's business strategy; and (xxii) the risk and uncertainties described in “Risk Factors,” “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” “Cautionary Note Regarding Forward-Looking Statements” and the additional risk described in Arbe’s prospectus dated November 2, 2021, which was filed by Arbe with the Securities and Exchange Commission on November 4, 2021, as well as the other documents filed by Arbe with the SEC. Accordingly, you are cautioned not to place undue reliance on these forward-looking statements. Forward-looking statements relate only to the date they were made, and Arbe does not undertake any obligation to update forward-looking statements to reflect events or circumstances after the date they were made except as required by law or applicable regulation.

Autonomous Cars Are Not Yet Here…

- In 2020, you'll be a **"permanent backseat driver",** claimed The Guardian (2015)
- **"10 million self-driving cars will be on the road by 2020",** read a Business Insider headline (2016)
- General Motors, Waymo, Toyota, and Honda expected to be **making self-driving cars by 2020**
- Elon Musk forecast that **Tesla would do it by 2018** — and when that failed, by 2020

It's 2022 and self-driving cars still aren't here.



Instead, We Get News Like This...

Vehicles are still missing **machine perception:** The ability to sense and interpret the world around them.

We expect autonomous vehicles to be **better than human.**

We cannot accept failures!

It’s The Sensing, Stupid!

Cameras:

Issues with everyday use cases, not just corner cases!

- Limited by weather and lighting
- At risk of blinding
- Cannot measure velocity
- Lack depth perception
- Limited in range

Current Radars are a Hazard

Radars:

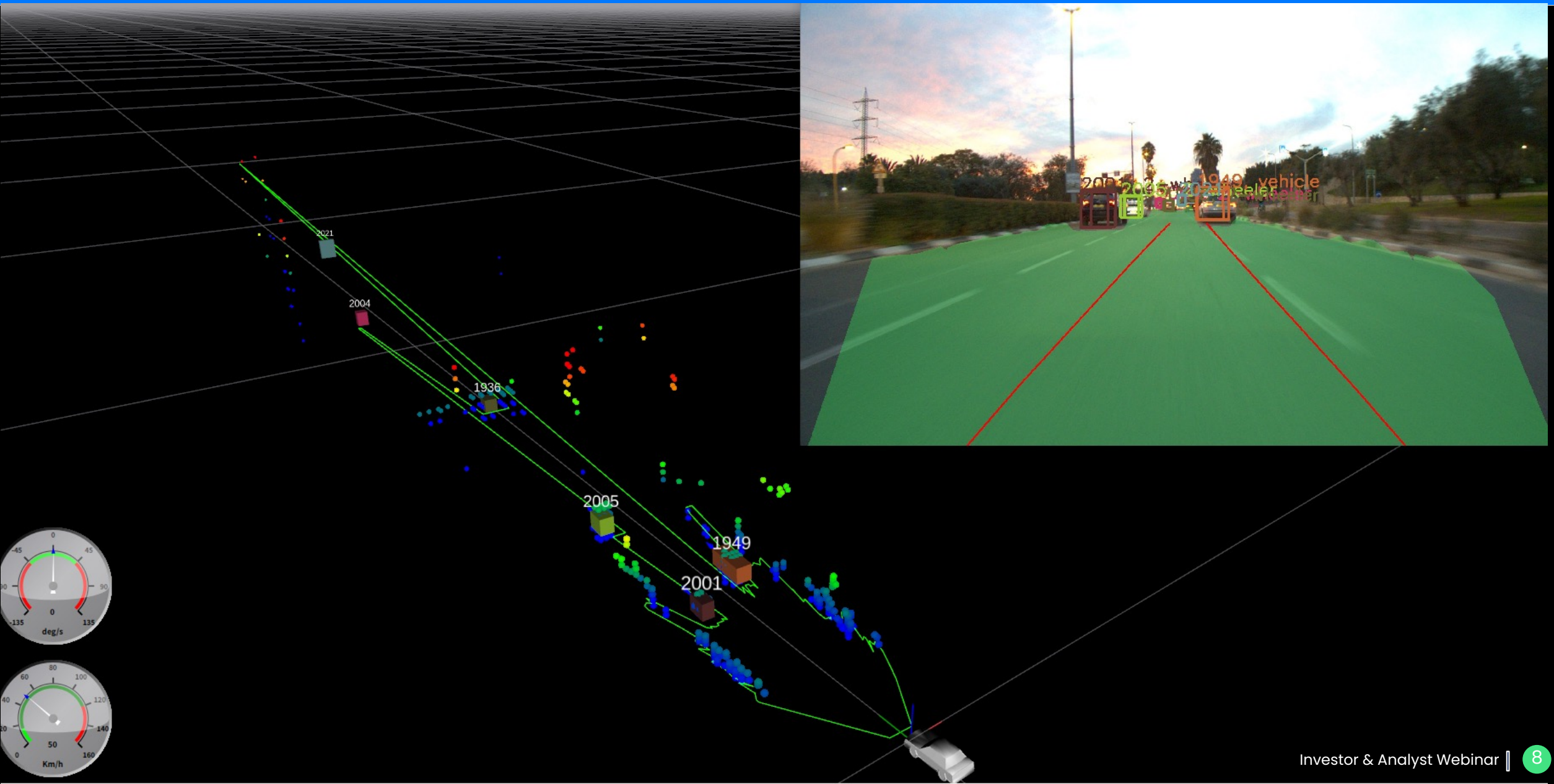
Not advanced enough for L2+ and NCAP safety!

- Extremely limited resolution
- No elevation
- Cannot reliably detect stationary objects

Current Radars are a Hazard: Stationary Objects

Lack of resolution - especially in elevation – results in ignoring stationary objects. This is unacceptable for perception and free space mapping.

Free Space Mapping



Current Radars are a Hazard

Radars:

Not advanced enough for L2+ and NCAP safety!

- Extremely limited resolution
- No elevation
- Cannot reliably detect stationary objects
- High false alarm rate
- Unable to track multiple targets

Bottom line:

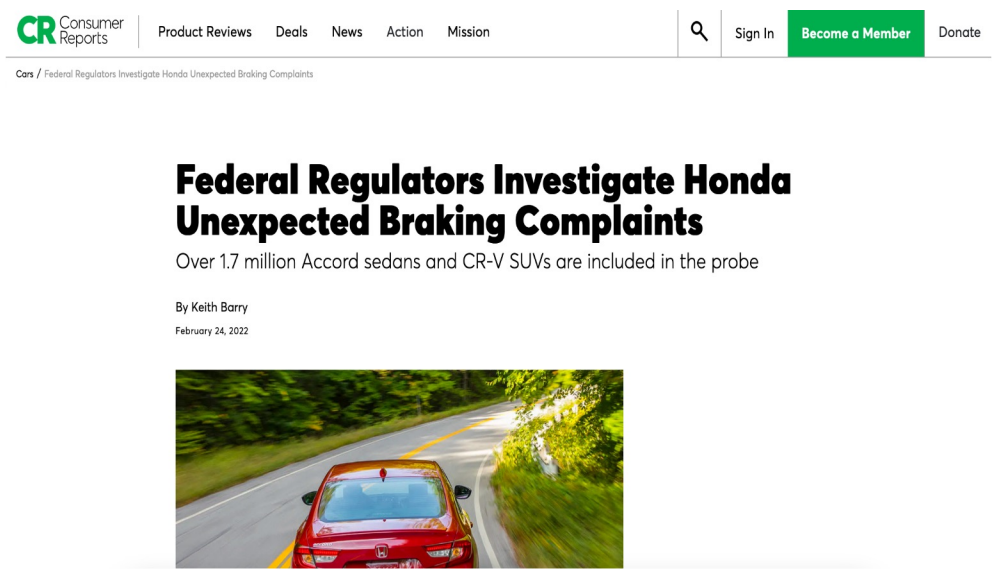
Current radars are irrelevant for perception.

Current Radars are a Hazard: False Alarms

False alarms are the reason current radars are not trustworthy.

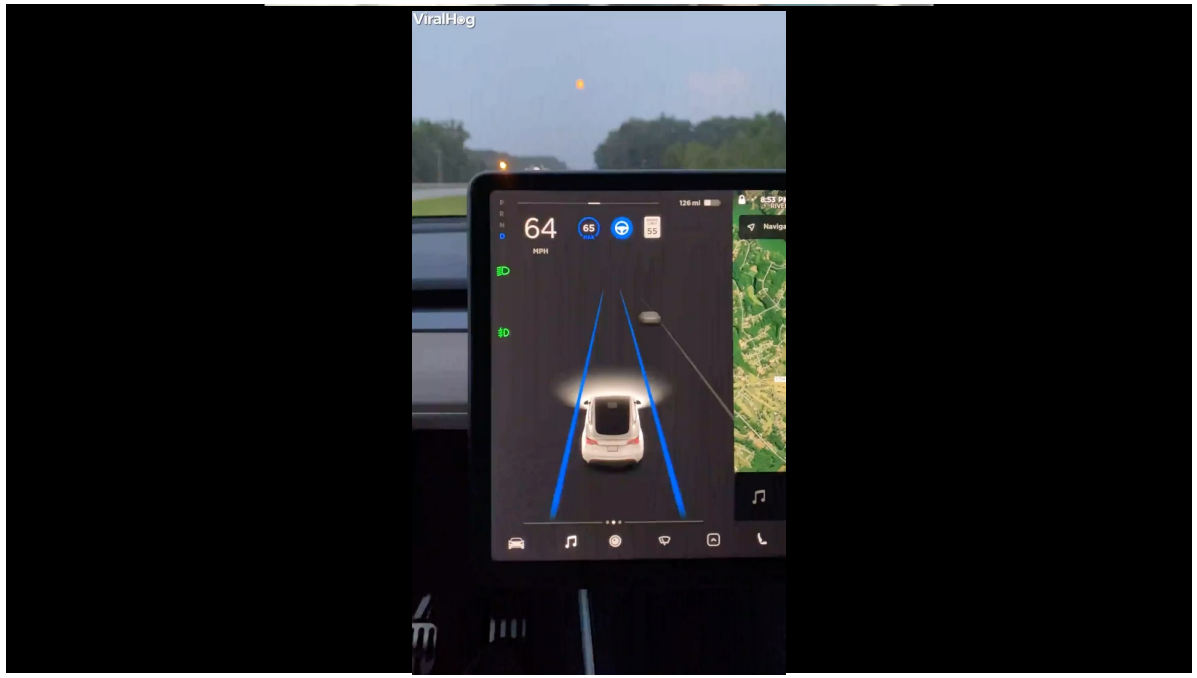
"We had horrible experiences with the traffic-aware cruise control slamming on the brakes for no apparent reason, with nothing ahead or passing cars. Behavior can be 5-10 mph slowdowns or in some cases FULL brake pressure, which puts us in danger of being rear ended. Multiple times we have been close to rear-ended."

Testimonial collected by NHTSA

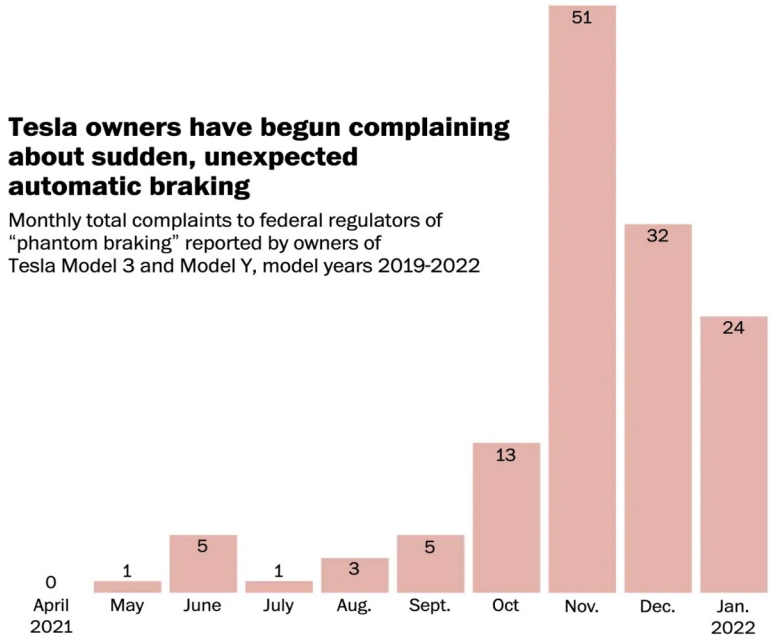


Sensor Suites Without Radars Are Even Worse…

My vehicle thinks the moon is a yellow light



There is nothing funny about this…



Source: Electrek

Owners of Model 3 and Model Y vehicles have been reporting an increased number of phantom braking events, after the software update to vision-only Autopilot in May 2021.

An Industry-Wide Challenge

The automotive industry is shifting to autopilot and full autonomy.

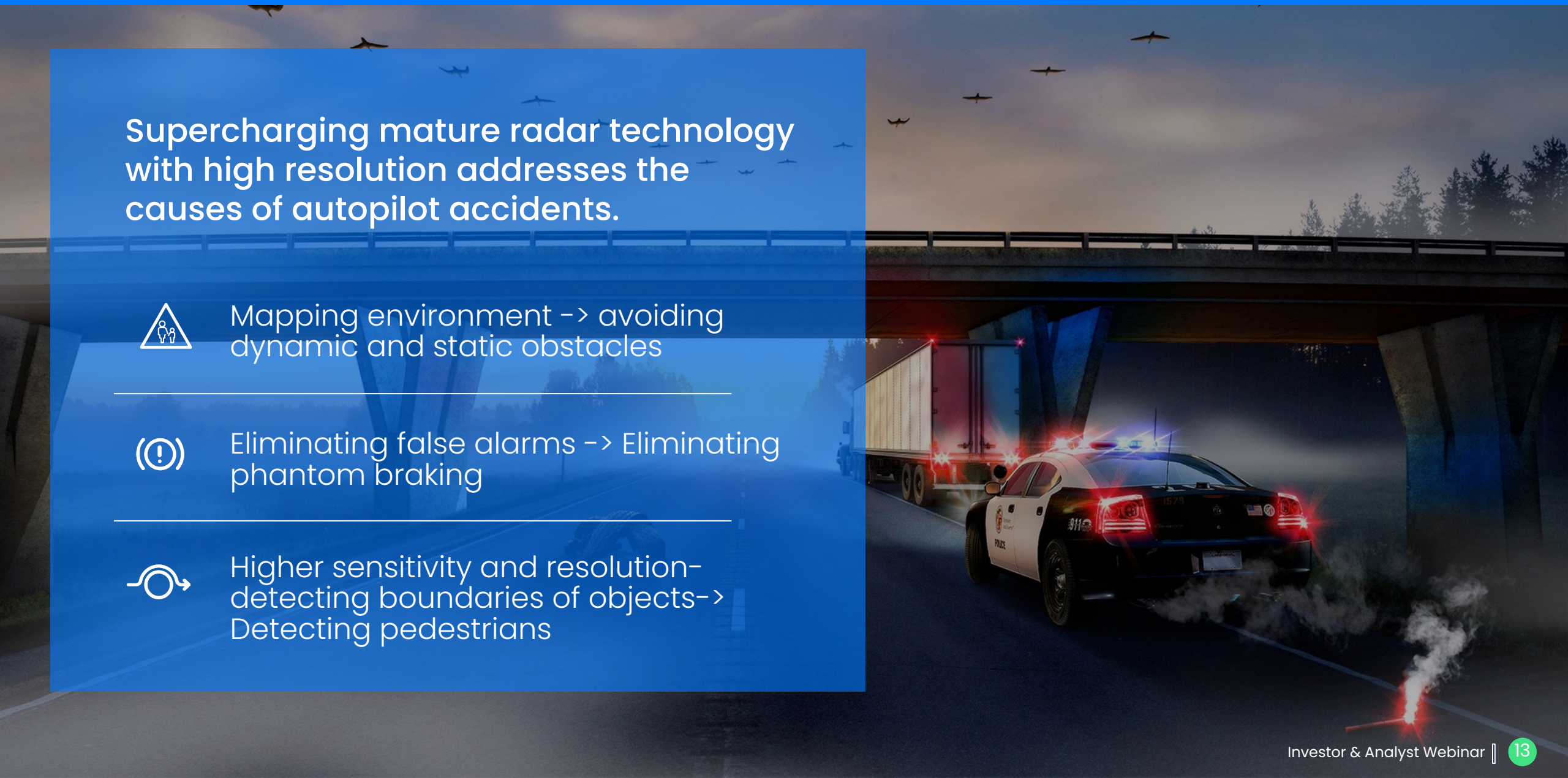
If that shift is **based on current sensors,** we'll end the decade with **more accidents** instead of fewer.

This will be a **widespread** issue, we need to address it now.

Imaging Radar Resolves the Shortcomings of Traditional Radars

Supercharging mature radar technology with high resolution addresses the causes of autopilot accidents.

- Mapping environment -> avoiding dynamic and static obstacles
- Eliminating false alarms -> Eliminating phantom braking
- Higher sensitivity and resolution- detecting boundaries of objects-> Detecting pedestrians

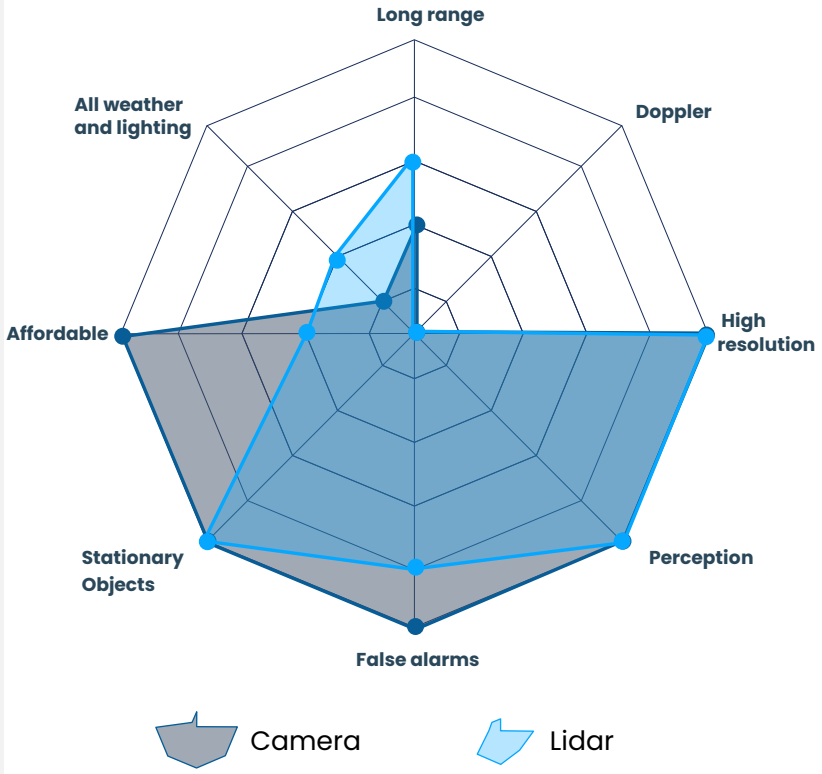


Finding the Sensor Suite Solution For All Use Cases

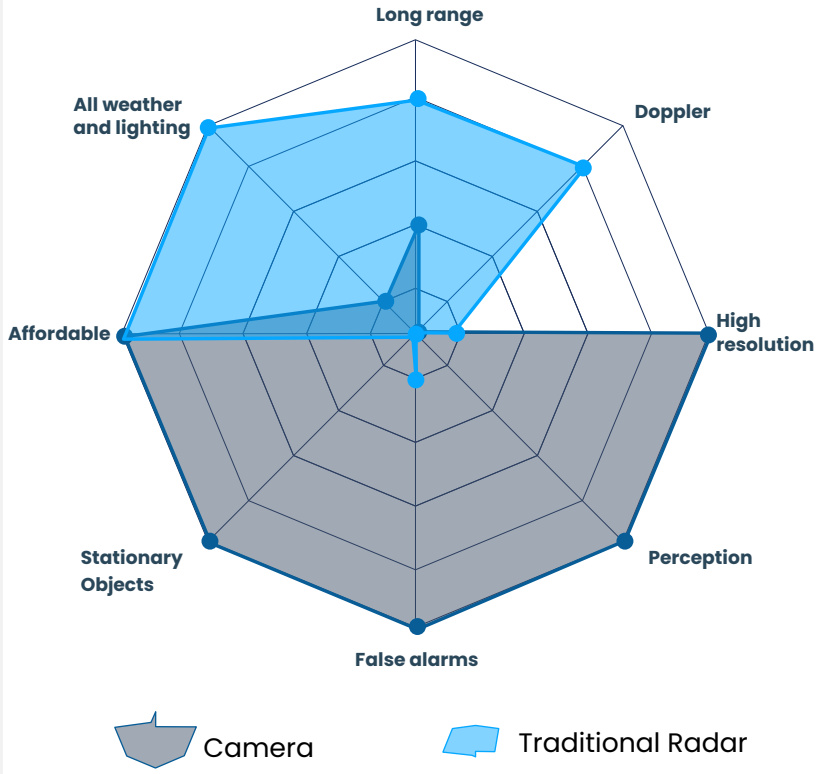
Any sensor gap is unacceptable.

Even if cameras were able to cover 99% of use cases, another sensor that gives real redundancy is still necessary.

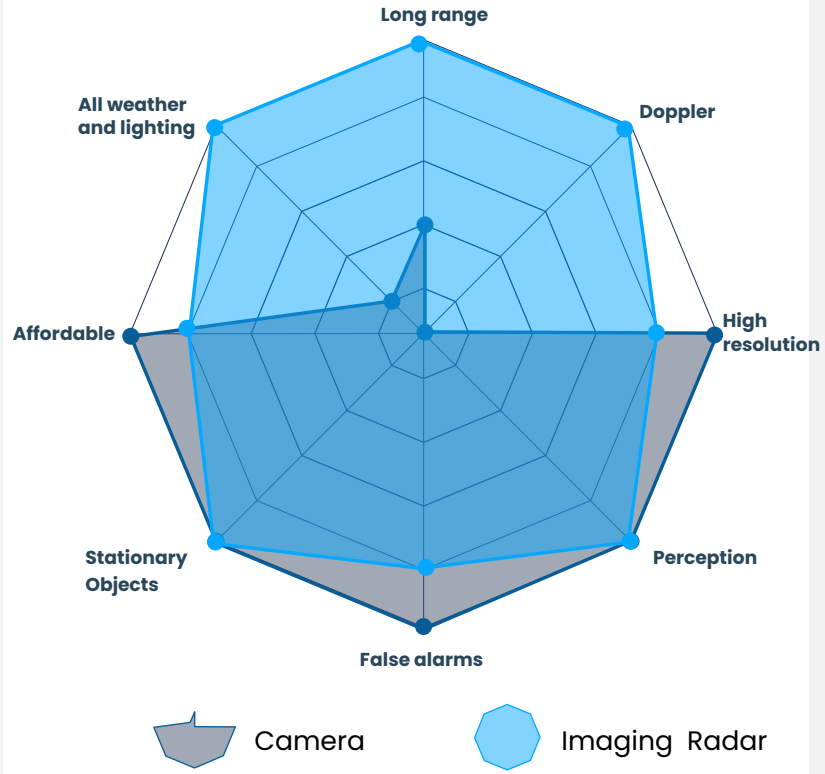
Camera + Lidar



Camera + Traditional Radar



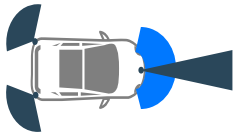
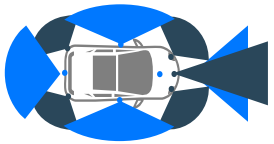
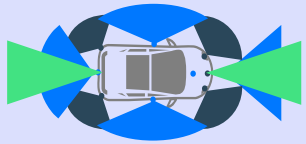
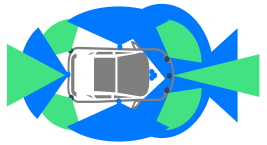
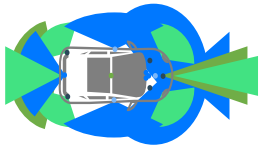
Camera + Imaging Radar



Introducing Level 2+ Autonomy

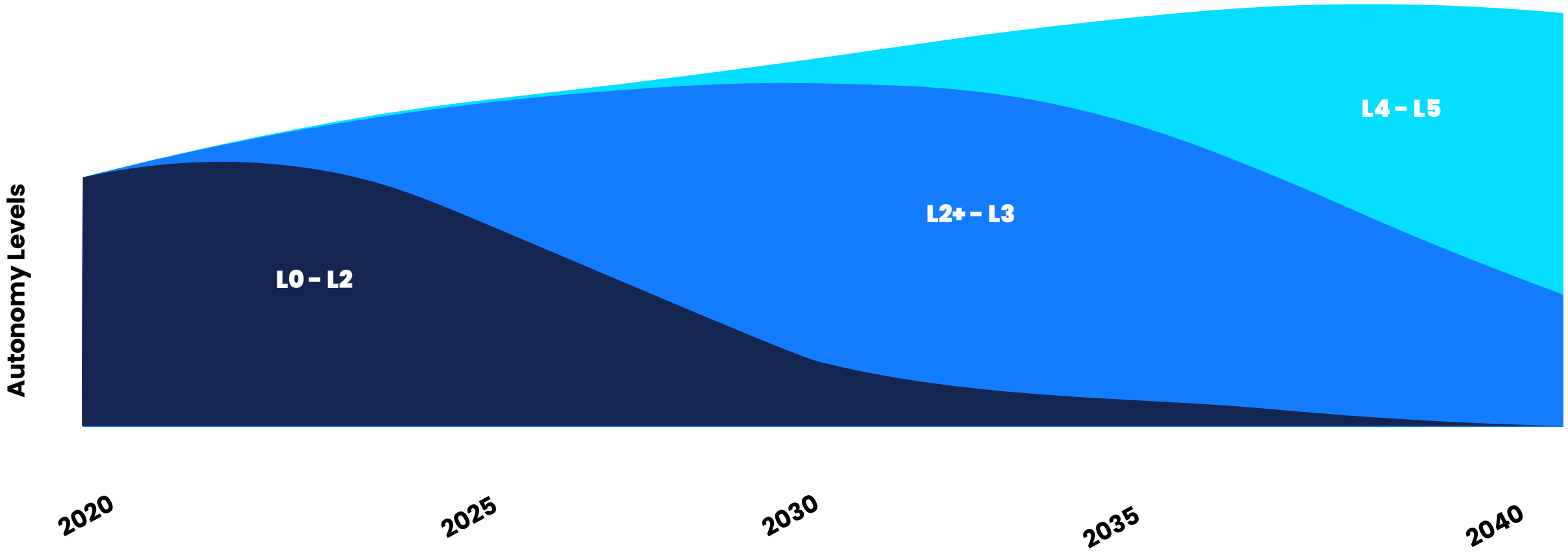
The higher the autonomy level:

- the greater the demands placed on the sensor suite
- the more sensors required

Autonomy Level	Level 1	Level 2	Level 2+	Level 3	Level 4-5
					
# of Sensors per Vehicle[1]					
			Perception is needed		
Imaging Radar		0-1	2-7	4-7	6-10
Radar	3	3-5	0-4	0-4	0-4
Camera	2	≤4	≤4	6-8	14
LIDAR	0	0	0	0-1	4

A Comprehensive Industry Shift

Over the next decade, L2+ and L3 autonomy will become standard mass market vehicle features.



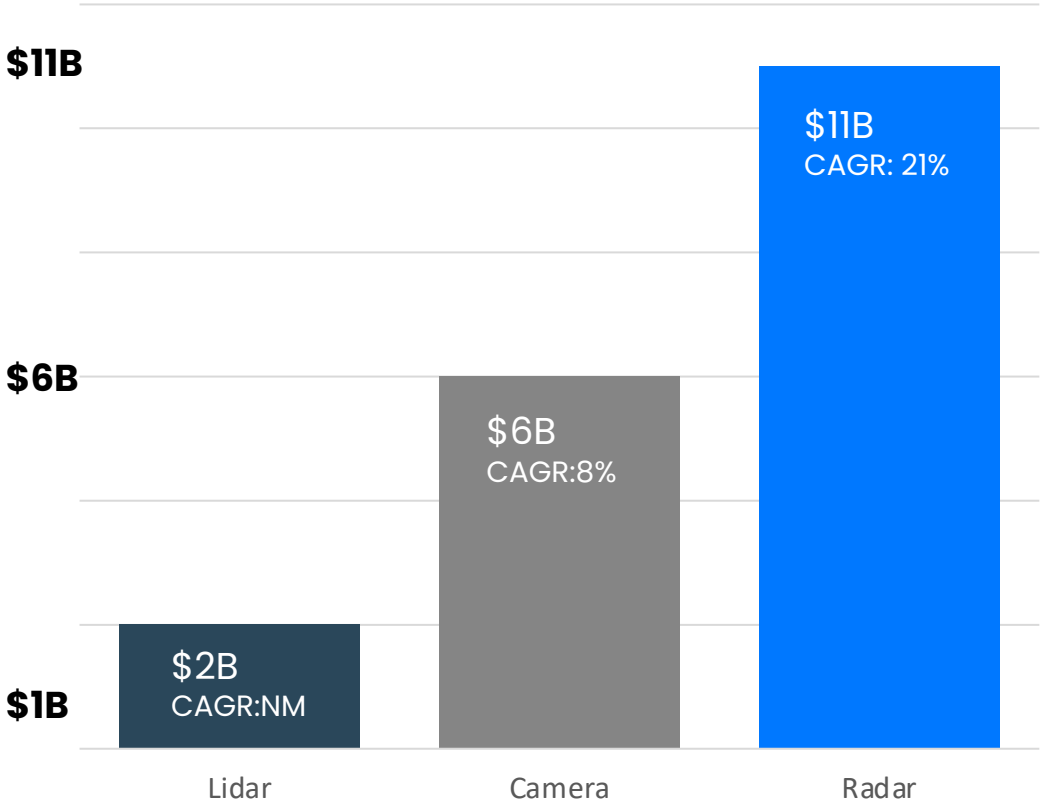
A Staggering Total Addressable Market (TAM)

A GROWING NUMBER OF VEHICLES +

MULTIPLE RADAR SENSORS IN EACH SENSOR SUITE

= HUGE POTENTIAL

2025 TAM Opportunity[1]



[1] Industry and Wall Street research estimates

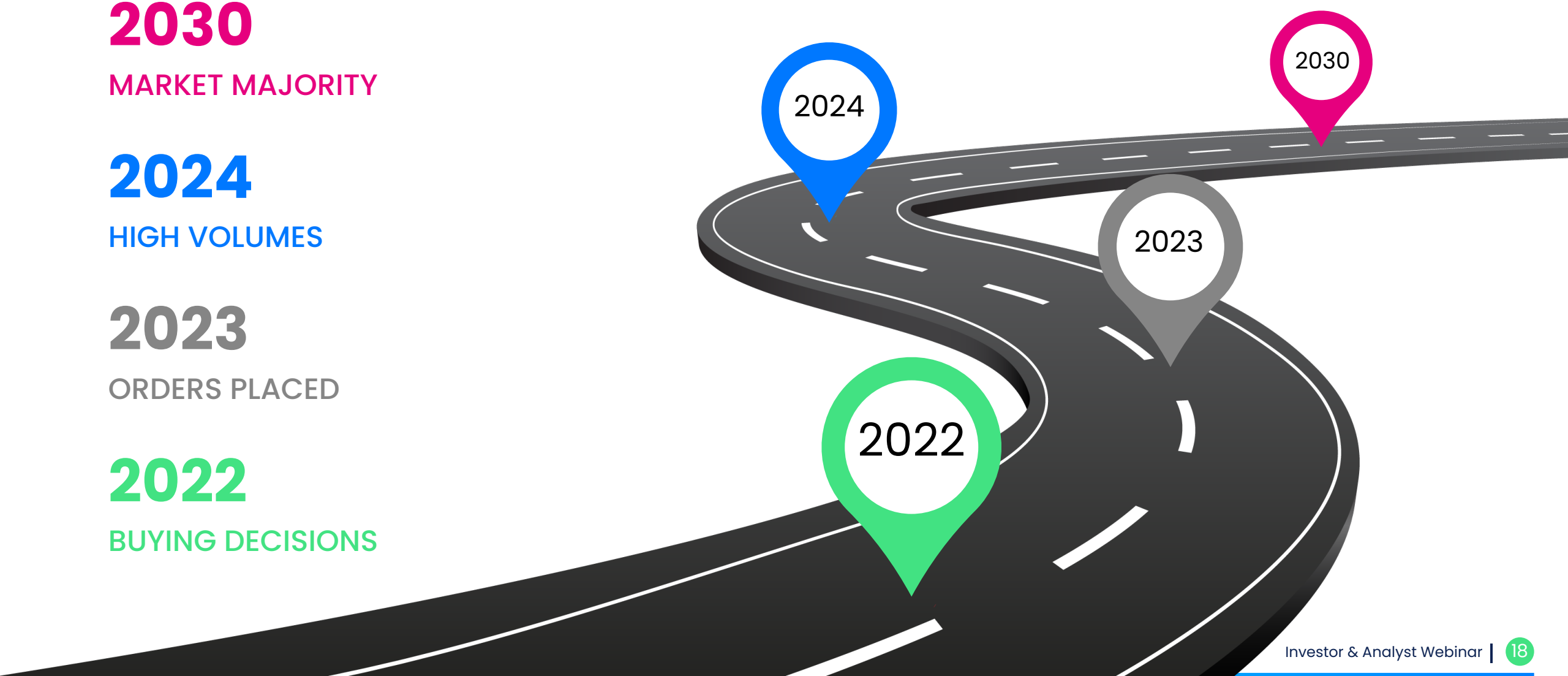
Now is the Moment the Wheels Are Set in Motion!

2030
MARKET MAJORITY

2024
HIGH VOLUMES

2023
ORDERS PLACED

2022
BUYING DECISIONS



Imaging Radar Markets

OEMs
- 2025 and up
- Level 2.5 / Level 3
- High volume
- Innovation and safety

Trucks
- 2023 and up
- Level 2.5 / Level 3
- Low volume, high price
- Safety and efficiency

Delivery Robots
- 2023 and up
- Level 4
- Mid volume
- Efficiency

RoboTaxi
- 2024 and up
- Level 4
- Low volume , high price
- Efficiency

Significant opportunities exist both within and beyond these markets.

Arbe’s Radar Revolution

What Makes Imaging Radar… Imaging Radar?

Simple- you should see a clear image, with elevation and free space mapping.

No ambiguities or false alarms!

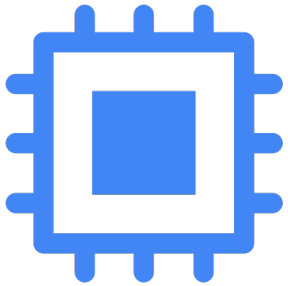
The way to achieve this is by having large number of channels!

Why is Achieving 2K Channels is So Difficult?

Expanded channel array

Industry
From 12
up to 192

Arbe
2,304



Dedicated Rf Chipset for massive channel count

Evolution in Processing Capabilities

Number of Channels	Processing Solution
• 12	• DSP
• 48	• High end processor
• 192	• FPGA
• 2,304	• A dedicated processor

Arbe is closing a 10x gap with a dedicated processor that can scale up in the future.

Mobileye, the #1 player in perception, announced that their 2025 radar system will include the same number of channels – 2,304

Arbe - Driving a Revolution in Safety and Autonomy

The highest quality radar image on the market

Highest physical resolution, elimination of false alarms, and Doppler ambiguities

Creating a holistic sensor suite

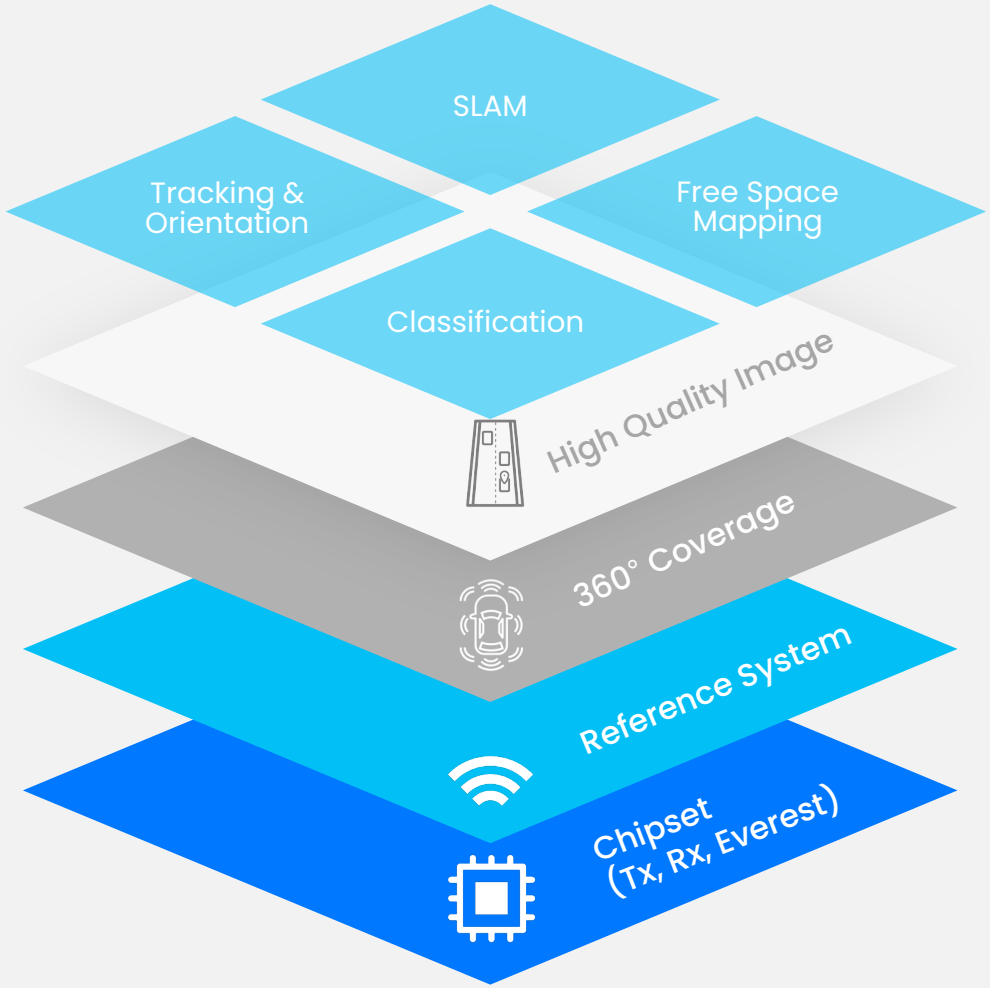
Complementing the camera to achieve full environment sensing and redundancy covering all use cases

The 1st radar to empower perception algorithms

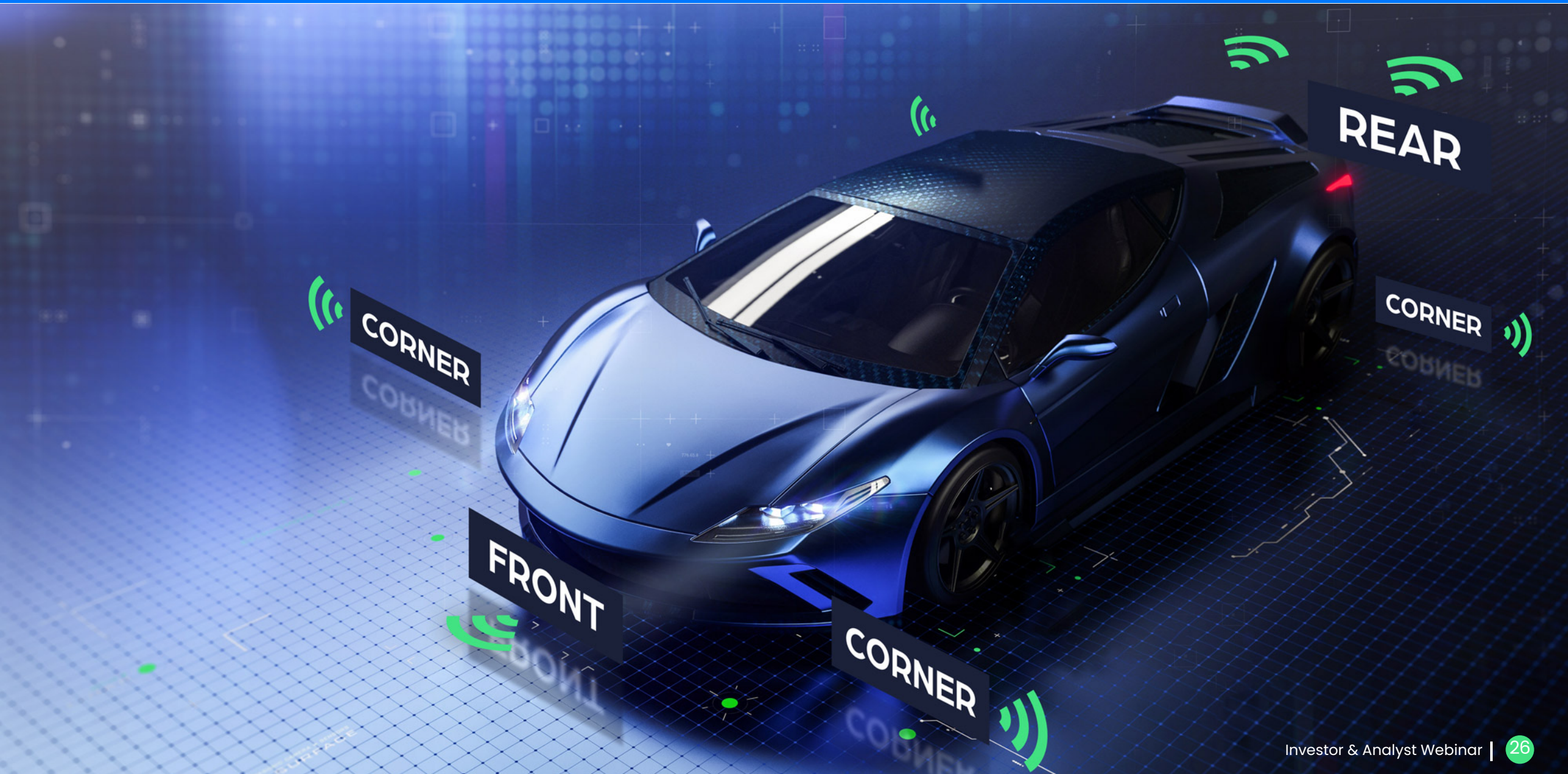
A paradigm-changing achievement of free space mapping, object tracking, and SLAM

Product Architecture and Applications

- High native resolution
- Patented modulation
- Dedicated radar processor able to process very high data rate
- Perception Imaging capabilities



360° Coverage



Miles Apart from Competitors

Performance Leadership

The first radar to meet the needs of the perception teams

Affordable Price Point

Optimized solution for the automotive industry with dedicated processing

Fully Automotive Qualified

We collaborate with
Tier 1 market leaders

First to Market

With a production-ready solution

Arbe: First Mover & Market Leader in 4D Imaging Radar

World's First

Ultra-high resolution radar solution

Proprietary chipset

Perception radar software

Paving the way for an autonomous future

Arbe Today

Founded in 2015

team members 130

R&D 80%

Nasdaq listed ARBE

END

We'd love to continue the discussion!

Contact us at:

investors@arberobotics.com