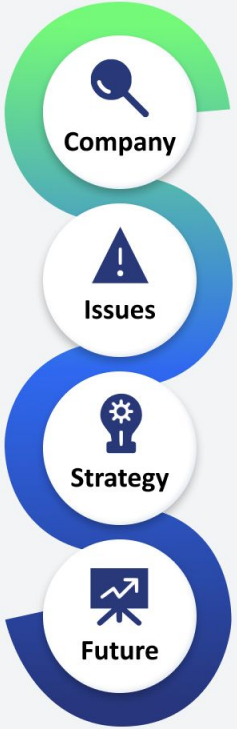
RSA Consulting

Driving the Radar Revolution

Tiger Global Case Competition

arbe

Executive Summary: Setting the Stage



1. Reimagining safety	2. Providing affordability	3. Pioneering key solutions
1. Limited US presence	2. Not enough resources and funding	3. Competition with well-funded and established companies

Phase 1: Establish a Presence

Phase 2: Solidify L2 Impact

Phase 3: Robotaxi Revolution

Phase 4: Paving the Future

$280M
Additional revenue by 2030

$37M
In profit in 2030 alone

87K+
Robotaxis supplied in 2030 alone

Sources: Appendix 2

Arbe: Pitching the Radar Revolution

4D

Ultra-high resolution [1]

100x

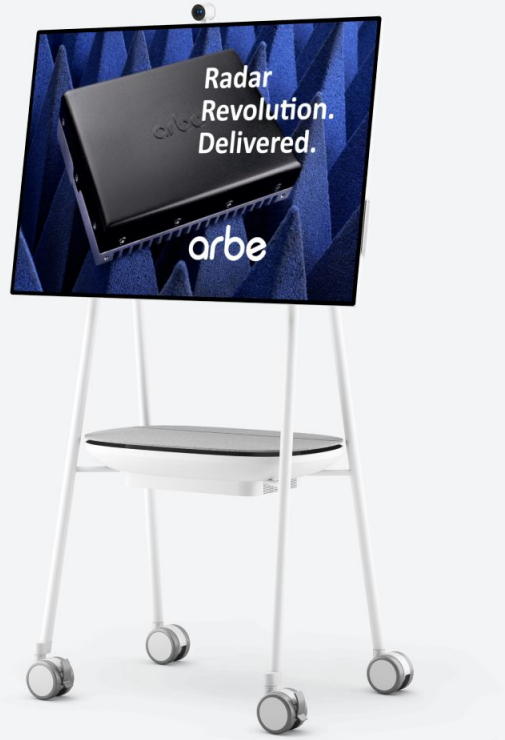
More detailed image than any other radar [2]

All

Weather and lightning conditions [3]

1. **Reimagining safety**
2. **Providing affordability**
3. **Pioneering key solutions**

1° Azimuth 2° Elevation Ultra high resolution	100° Azimuth 30° Elevation Wide field of view	300m Long range	30 FPS Real time	No Doppler Ambiguity
7.5cm–60cm High range resolution	0.1 m/s Doppler resolution	≈0 Minimal false alarms	100s Objects identified	Low latency



Sources: [1] Arbe, [2] TechCrunch, [3] TGCC Case Study

Arbe: Delivering Pioneer Products in the US

1 Reimagining safety

- **Phoenix** technology [1]
- Tackles **all core issues** that have caused recent accidents
- Arbe Radar **Chipset** Solution

2 Providing affordability

- Phoenix process **reduces costs**
- Lowest power per channel in the industry

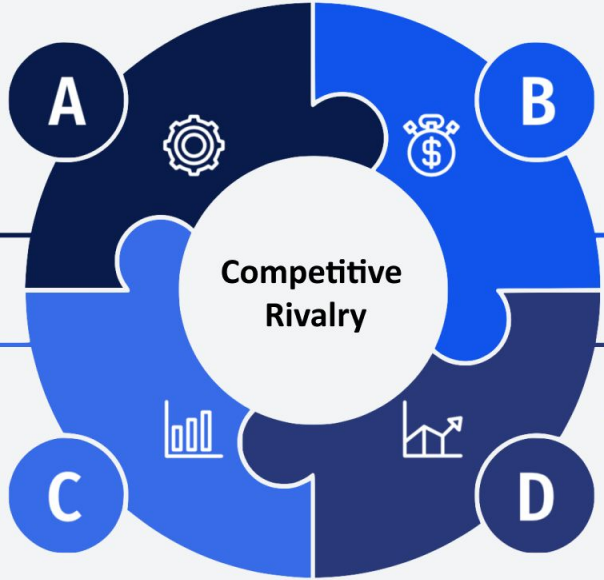
3 Pioneering key solutions

- **"Missing link"** in the L3+ autonomous vehicle evolution
- First chipset to leverage advanced **22nm RF CMOS** process
- **2300+ channels** vs. 12 channels

Sources: [1] Arbe, [2] SEC

Analyzing the Industry and 3 Key Issues

Porter's 5 Forces: US Robotaxi Industry



Supplier Power
High
- High dependency (chips)
- Provide unique products
- High demands/volume

Buyer Power
High
- Small buyer volume
- Big order size
- Bargaining power

Threat of New Entry
Low
- Demands differentiation
- Limited brand identities
- Patents & trade secrets

Threat of Substitutes
High
- Alternatives e.g. non-AV/EV cars and taxis
- Cheap public transportation (subway or bus)

Issue 1

Limited US presence
- Yet to establish reputation
- Hinders growth potential

Issue 2

Not enough resources & funding
- Limited revenue to reinvest
- Less-proven technology

Issue 3

Competition with well-funded & established companies
- e.g. Mobileye, Uhnder [1][2]

Sources: [1] SEC, [2] Mobileye

Business Plan: Four Phases to Success

PHASE 1: Establish a Presence

- SPAC (funds)
- NVIDIA Drive[1]
  - Software Platform
  - Improves accessibility[2]
- Add US Personnel
- **Partner with GM or Ford**
- Develop position in L2+ autonomy

PHASE 2: Solidify L2 Impact

- Provide sensors for L2
- Reinvest profits into technology development
- Earn trust & become reputable in US AV industry
- **Prepare for L3-5 autonomy**

PHASE 3: Robotaxi Revolution

- Leveraging strong position in L2, provide radar technology for L3-5 robotaxis and experience massive growth
- Partner with new robotaxi companies to provide technology and support

PHASE 4: Paving the Future

- Facilitate more partnerships
- As Arbe grows, higher-level partners
- As innovative companies become profitable
- Continue PHASE 1-3 initiatives

Sources: [1] Nvidia, [2] Yahoo! Finance, [3] Markets and Markets

Business Plan: Potential Partners

Partnership with GM/Cruise

- Cruise = robotaxi/AV company owned by GM
- Test technologies using Nvidia Drive [1]
- Sell products for GM's L2 autonomous vehicles (Cadillac, Buick, Chevrolet) [2]

Partnership with Ford/Argo

- Argo = L4/5 AV company owned 40% by Ford and 40% by Volkswagen [3]
- Partnered with Lyft to create autonomous ride-hailing system [4]
- 2021 Mustang MachE, Fusion, F-150 Lightning E have L2 autonomy [5]

PHASE 1 Partners
General Motors (Cruise), Ford (Argo AI, Lyft) [6]

Sell sensors to GM for L2+: gain resources & experience

Reinvest L2+ profits into R&D to better prepare for L4/5

PHASE 2 Partners
Continuing from Phase 1

PHASE 3 Partners
Zoox

Supply sensors to partners as they expand into L4/5 autonomy, ride the huge market growth wave

Develop specialized chips for principal partners, facilitate partnerships with innovative companies as they become profitable, expand into new markets

PHASE 4 Partners
Arrival, Aurora, Uber, Lyft, Waymo

Sources: [1] Nvidia Drive, [2] Cars.com, [3] CNBC, [4] Forbes, [5] AI Trends Images: Arrival, Embark, Cruise, Zoox, Argo AI

Evaluating Arbe's Financial Future

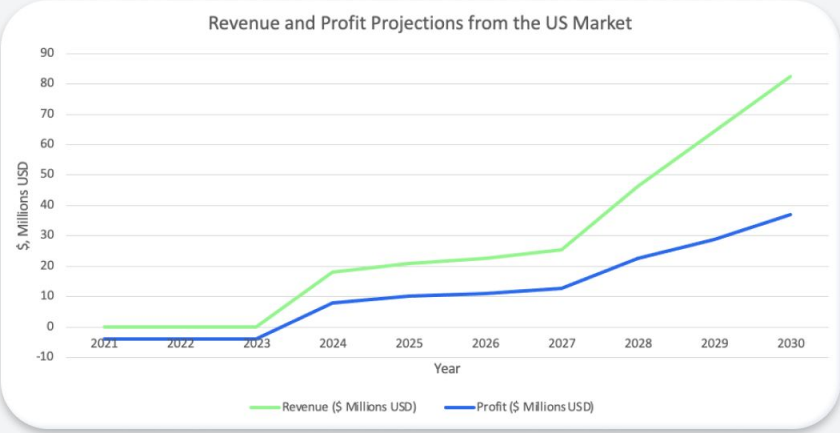
In addition to the projected revenues, our plan can generate an **additional $280M** in revenue by 2030.

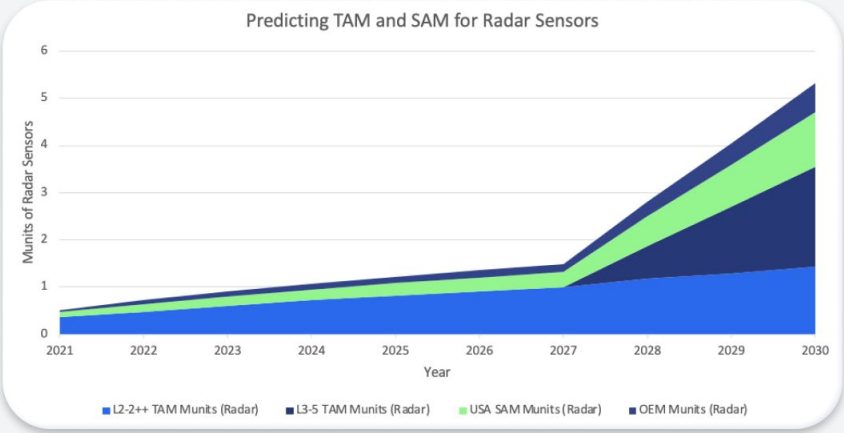
2024: $18M added
2025: $ 21M added
2026: $22.5M added
2027: $25.5M added
2028: $46.4M added
2029: $64.4M added
2030: $82.3M added

Start price: **$150/sensor**
Expected to decrease to **$135/sensor** by 2030 due to economies of scale and greater efficiency of production [1], [2]

New *Operating Expenses* costs from hiring US personnel and engineers will cut into profits, but our plan will still generate **$37.0M** in profit in 2030 alone.

Arbe can supply just **over 45K** robotaxis with radar sensors in 2028, and **over 87K** robotaxis in 2030 [1]





Sources: [1] TGCC Case Study, [2] Business Insider, Appendix #2

Preventing Risks from Becoming Roadblocks

US Regulation

- Meet standards on both federal and state levels
- NHTSA, FMVSS, and DOT
- Initially the profit margins would increase, but may change in future

Liabilities

- Prevent future liabilites by testing safety of radars
- Create a legal safety net if an issue does occur

State regulation inconsistencies

- Continue to update its privacy and data security regimes to keep ahead of changing individual US state regulations

Autonomous vechicle projections do not materialize

- Selling to L2 (already established) ensures some revenues
- Apply technologies to other markets (e.g. agricultural tools, robots, smart traffic systems, heavy transportation & machinery) [1]

Pushback from the public

- Establish credibility and reputation
  - Publicize safety tests
  - Use positive marketing to encourage a shift towards autonomous driving

US companies don't want a partnership

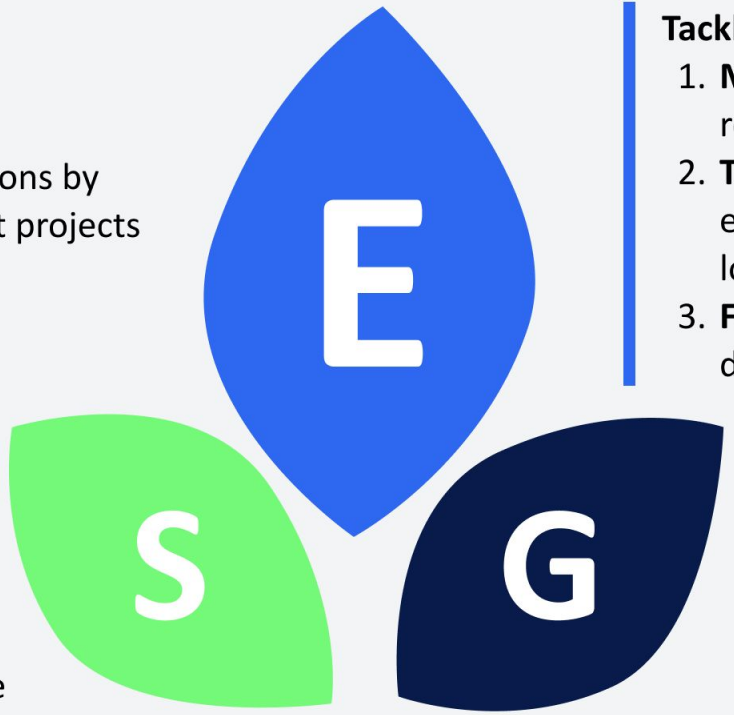
- Identify their pain points and work to fit their needs (win-win situation)
- Emphasize radar market's projected growth ($1.3B by 2030) [2]

Sources: [1] SEC, [2] TGCC Case study

Cultivating conscientiousness through ESGs

Environmental

Buy carbon offsets [1]
Neutralize carbon emissions by investing in carbon offset projects



Tackle 3 main CO_2 components

1. **Manufacturing of parts** (e.g. recycled components)
2. **Transportation of parts** (e.g. efficient vehicle technologies & low-carbon fuels)
3. **Facilities** (e.g. reduce energy demand from buildings)

Social

Company DEI
Dedicated equity & inclusion officer, diversify workplace

Youth mentorship initiative (women and minorities)
Foster a diversified workforce

Governance

Promote diversity on board
Provides valuable perspectives for company, investors & regulatory bodies approve

Sources: [1] Investopedia

Synthesis

Leverage 4-phase plan

PHASE 1: Establish a Presence

PHASE 2: Solidify L2 Impact

PHASE 3: Robotaxi Revolution

PHASE 4: Paving the Future

Pitch differentiaters

1. Reimagining safety
2. Providing affordability
3. Pioneering key solutions

Cultivate ESG initiatives

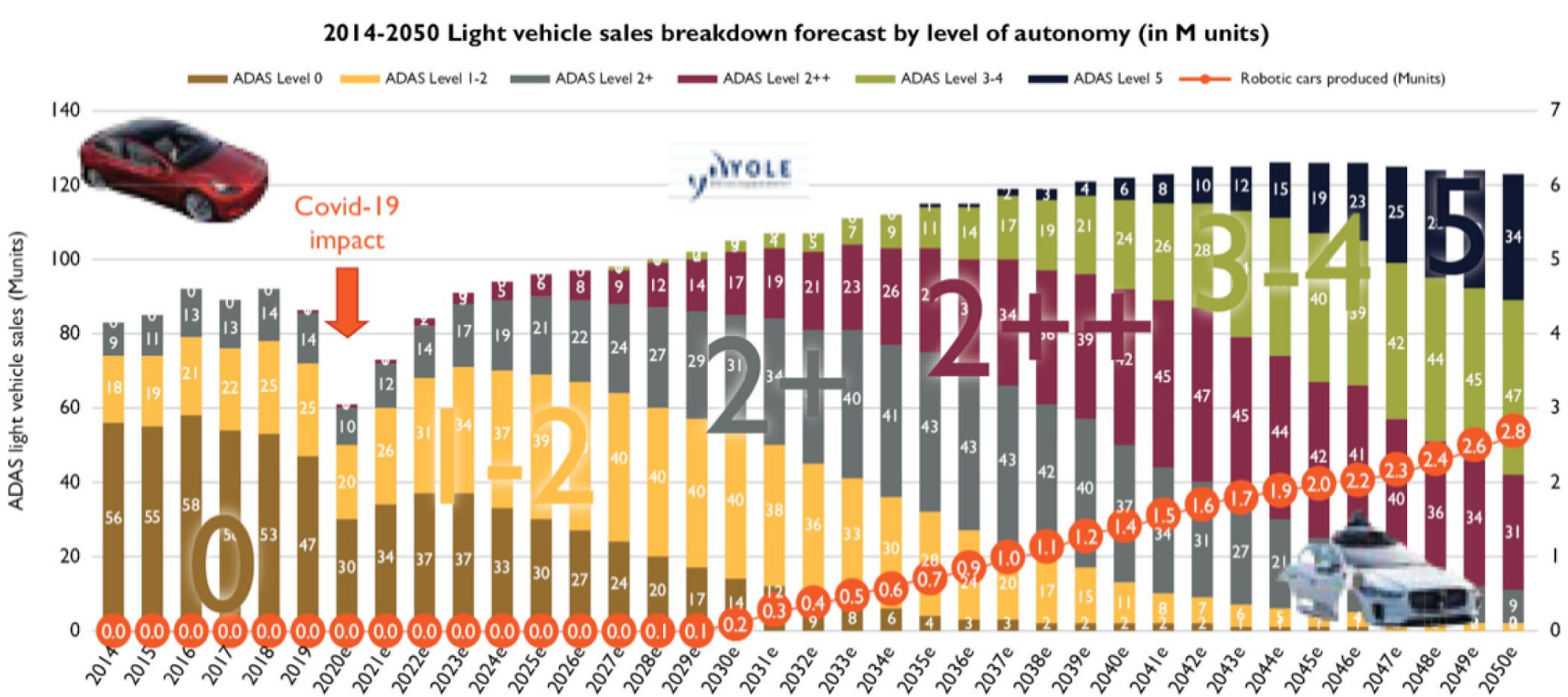
Sources:

RSA Consulting

Thank you!

Q&A

Appendix # 1



* Source: Yole, The Radar Industry is Entering its Commercial Era, June 2020.

Source: SEC

Appendix #2

Elaboration on Financials (TAM, SAM, Units)

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
L2-L2++ vehicles (M units) [1]	0.12	0.16	0.20	0.24	0.27	0.30	0.33	0.39	0.43	0.48
radar sensors/car [2]	3	3	3	3	3	3	3	3	3	3
L2-L2++ TAM sensors (M units)	0.36	0.48	0.60	0.72	0.81	0.90	0.99	1.17	1.29	1.44
L3-L5 vehicles (M units) [1]								0.1	0.2	0.3
Radar sensors/car [2]								7	7	7
L3-L5 TAM sensors (M units)								0.7	1.4	2.1
% USA [3]	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%
USA SAM (M units)	0.12	0.16	0.20	0.23	0.27	0.30	0.33	0.62	0.89	1.17
OEM % of US market [4]	17.3%	17.3%	17.3%	17.3%	17.3%	17.3%	17.3%	17.3%	17.3%	17.3%
OEM (GM/Ford partnership)	0.02	0.08	0.10	0.12	0.14	0.15	0.17	0.32	0.46	0.61

Sources: [1] Yole, [2] TGCC Case Study, [3] Accurize Market Research, [4] Statista

Appendix #3

Exhibit 16. Number of sensors needed per vehicle by level of autonomous driving

Sensor type	Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Camera	1-3	1-3	3-11	3-14	3-14	3-14
Radar	1-3	1-3	1-3	5-7	5-7	5-7
Ultrasonic sensor	6	6	8-12	8-12	8-12	8-12
Lidar	-	-	-	1	2	4

Source: HSBC Qianhai Securities

Elaboration on Financials (Revenue & Profit Graph)

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
ASP ($/sensor) [2]	150	150	150	150	150	150	150	145	140	135
Revenue ($, M)	0	0	0	18	21	22.5	25.5	46.4	64.4	82.3
Gross Profit				11.9	14.1	15.1	17.1	30.2	38.6	49.4
Gross Margin [2]	77 %	50%	68%	66%	67%	67%	67%	65%	60%	60%

Sources: [2] TGCC Case Study

Appendix #4

Mobileye

- Israeli Subsidiary of Intel (Intel purchased them in 2017 for $15.3M).
- Produces ADAS technology and software to enable autonomous driving
- Bigger than Arbe (revenue of $1B and 2100 employees)
- More products, but not as good at radar (which is why it is good that Arbe specializes)
- 3 years behind Arbe in radar technology, but is the only one close enough to compete
- Well-funded by Intel, lots of connections
- Plans to focus on playing the role of a 'tier 1' supplier to OEMs, competing with Arbe's customers

Sources: Mobileye, SEC

Uhnder

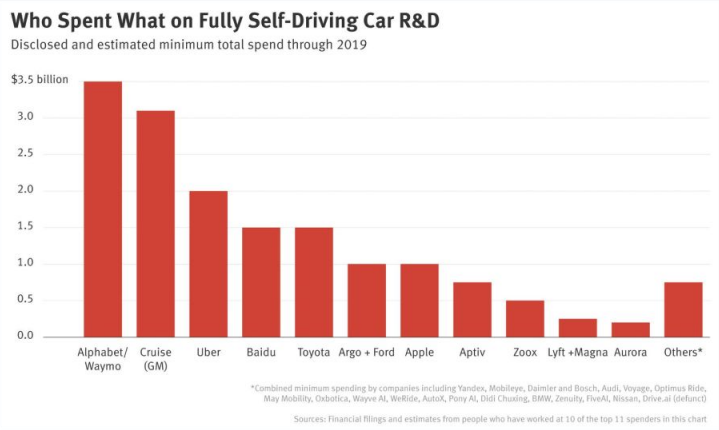
- Single Radar Chip (RoC)
- Uhnder signed an agreement with Magna in 2015 to be the supplier for their next generation radar sensor called ICON.
- ICON= high-resolution automotive radar
- incorporates advanced technology that can by the U.S. military to provide precise detection
- extensive range and high resiliency
- $45M total funding
- Already in the US market
- Chips use smaller size, less power, and lower costs

Sources: Uhnder, MicrowaveJournal

Appendix #5

Cruise

- Acquired by GM in 2016
- Investors: Walmart, GM, Honda, Microsoft
- Valuation: $30B
- Involved in Nvidia Drive, allowing easy sharing of technology with Arbe
- Focuses on building self-driving vehicles
- Planning to release Orgin vehicles (first-gen self-driving car) in 2023
- Well-funded by investors



Sources: CNBC, CrunchBase, NVIDIA Drive, Cruise

Argo

- Investors: Lyft, Volkswagen, Ford
- Valuation: $12.4B
- Builds hardware, software, maps, and cloud-support infrastructure to power self-driving cars
- Planning to deploy self-driving vehicles using Lyft's app in 2021
- Deployment of self-driving Volkswagen EV in 2022-2023
- Applications: e-commerce delieveries, transport of people along fixed routes in cities, off-highway applications (e.g., mining)

Sources: Reuters, Techcrunch