

ACADEMY OF ROBOTICS

DISRUPTING A 4 TRILLION DOLLAR INDUSTRY





WE DESIGN AND BUILD

Self-Driving Technology

STREET-LEGAL AND ON THE ROAD TODAY

- **Reduces cost** of delivery by up to 90%.
- Introduces self-driving vehicle technology for last-mile delivered as a **SaaS to B2B customers**.
- **First and, currently, only** custom built street-legal autonomous delivery vehicle in UK.
- **Currently on the road** semi-autonomously making deliveries.
- Received funding from the **UK government** in October 2020 with further funding provided in April 2021 via the government's Future Fund scheme.
- Launched by a **serial entrepreneur** who is an industry expert and has had 3 company exits.
- **Trials agreed** with several government departments and a major global corporation.

SUMMARY





Have you ever wondered how much it costs to deliver a package?

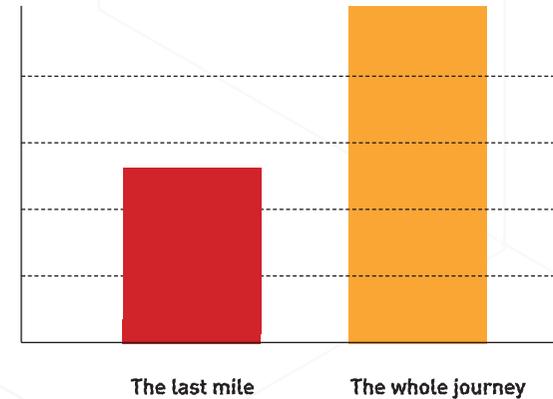
Vehicle cost per mile \$1.20 - \$1.60

Deliveries per hour 2-15

Labour cost per hour \$10 - \$17

Ave. unit cost of parcel delivery- \$10

Ave. amount consumers are prepared to pay - \$1.40



+50% of the cost of delivering a package occurs over the last mile. It's primarily due to cost of labour. This is one of the biggest problems in all of retail and logistics. It is called the last mile problem.





Global ecommerce market is worth

\$4 trillion

131 billion

Parcels sent globally in 2020

2.8 billion

Parcels sent in the UK in 2020

2x in 5 yrs

Est. global parcel volume growth

\$430 billion

Global parcel shipping revenue
2020

60%

of Europeans shop online

\$630 billion

Est. global ecommerce logistics
market value in 2025





CURRENT STATE-OF-THE-ART COMPETITOR 1

PAVEMENT DELIVERY ROBOTS

- Raised \$102 million at an estimated \$1 billion dollar valuation
- Travels at 4mph on pavements
- One payload at a time
- Time to delivery 30 mins per package





CURRENT STATE-OF-THE-ART COMPETITOR 2

DRONE DELIVERY

- Spearheaded by Amazon and hundreds of millions in funding
- Limited to rural and non-residential areas
- Illegal in most countries and not allowed with 10 miles of an airport.
- One payload at a time





CURRENT STATE-OF-THE-ART COMPETITOR 3

SELF-DRIVE DELIVERY VEHICLE

- Raised \$2.1 billion at a \$8.6 billion dollar valuation
- Travels on road with 4 payloads (190kg) at a time
- Uses lidar-based technology
- American based
- Not street-legal in Europe





OUR SOLUTION IS

KAR-GO



LIT
LONDON
2016





OUR SOLUTION IS

KAR-GO

- Raised £2.8 million.
- Travels on road with payloads of up to 24 packages.
- Uses computer vision and no lidar, making it up 10X lower cost than other solutions.
- Street-legal on European roads & currently deployed in the UK.
- Can drive on all roads.
- Reduces cost by up to 90%.





Self-driving vehicles driving on the road with other vehicles.

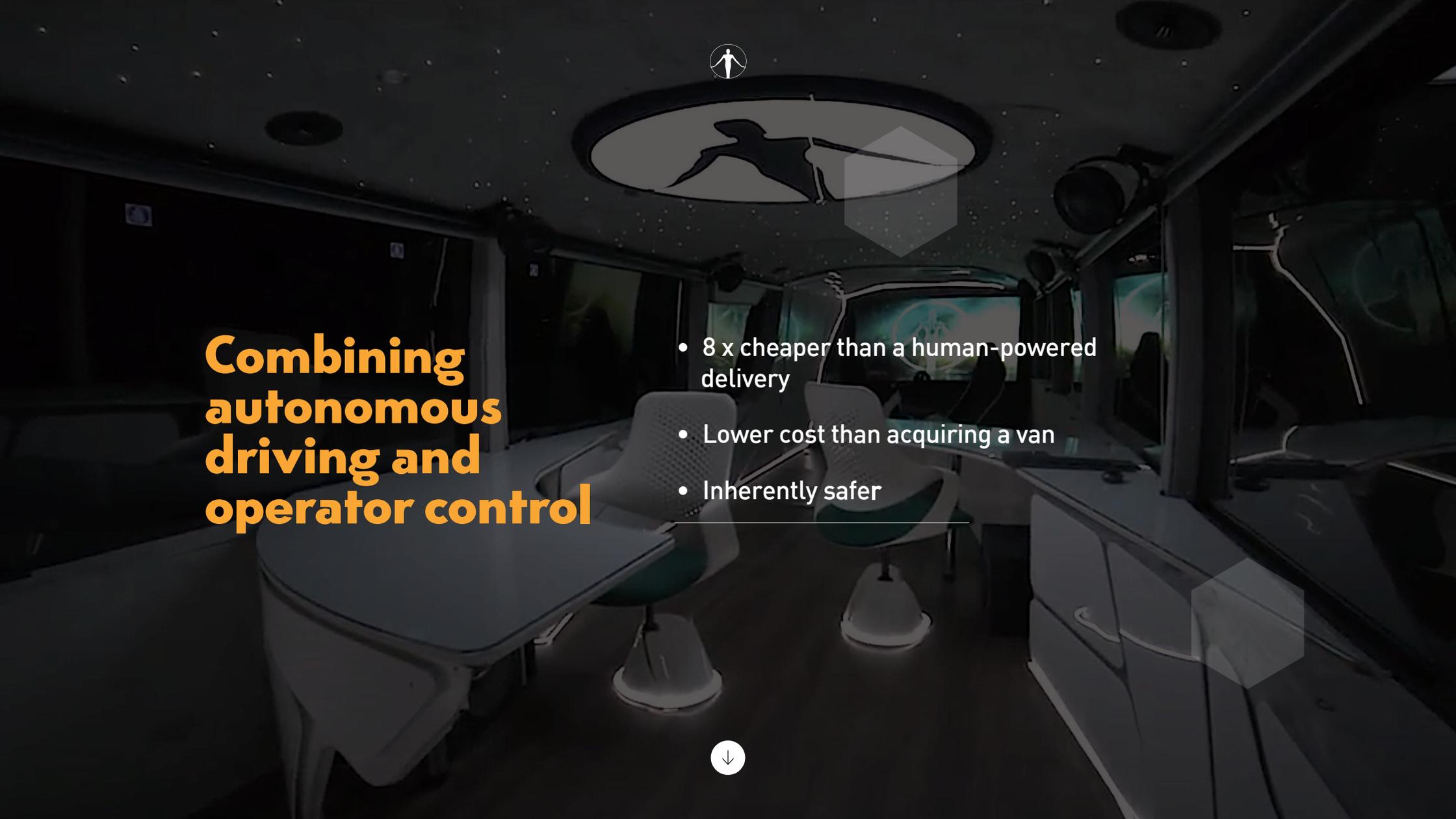
- Driving at average 20mph with a max of 60mph.
- Completing deliveries within 5-20mins.
- Optimised to drive on unmarked, residential roads.



Remote monitoring via mobile command hubs.

- Using our unique command hub operating system
- Enabling fully autonomous delivery process





**Combining
autonomous
driving and
operator control**

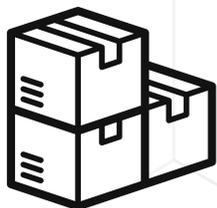
- 8 x cheaper than a human-powered delivery
- Lower cost than acquiring a van
- Inherently safer





HOW IT WORKS

Kar-go is designed to integrate with existing logistics systems and infrastructure. This enables existing couriers and retailers to simply plug our technology into their existing logistics eco-system and complete the last mile autonomously, as opposed to using a human operator.



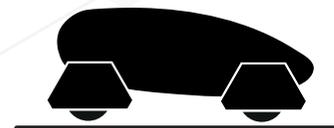
01

Goods arrive
at local logistics
or distribution hub



02

Customer calls up
deliveries when
convenient



03

KARGO
delivers package
in 5-20 mins





SAMPLE ECONOMICS



Example One

E-commerce firm with own fulfilment & delivery

- 1 million deliveries a month
- Average cost of delivery £17, including:
 - Long-haul £2.3
 - Last mile £14.6



Example Two

Crowd-sourced delivery firm

- 30k deliveries a month
- Deliveries in 2-5 miles radius, cost of delivery:
 - Last mile £7-12



Kar-go Economics at phase 3

Service area	9 sq. m
Households	7600
Daily deliveries	400
Number of Vehicles	04

Amortization	£0.13
Spare parts	£0.19
Battery + electricity	£0.01
Remote operator + data	£0.12 - £0.25
Maintenance & cleaning	£0.13
Insurance & loss-of-goods	£0.13
Amortization of control centre	£0.13
TOTAL	£0.87 - £0.98





BUSINESS MODEL

Our business model is very simple: We charge for the use of our technology.

By using our technology, corporations will be saved tens of millions in R&D as well as potentially saving hundreds of millions in last-mile delivery costs and most importantly, they will save time.

“Autonomous Vehicle Technology As A Service”

- **Last mile autonomous delivery sold as a service, including:**

- Sale or rental of vehicles & hubs infrastructure
- Operators’ and maintenance services
- Mapping
- Autonomous delivery platform and consultancy

- **Target customer groups:**

- Next-Gen delivery firms
- Incumbent delivery firms
- Retailers
- E-commerce players

3 existing paying customers with ~9 ongoing discussions



Eventual delivery cost per delivery after full implementation
(8X saving on human powered delivery)

Convenience	Zero emissions	Cost reduction	Safe
On-demand delivery in 15-30 minutes	Electric vehicles with zero CO2 emissions	Cost per delivery £2- £3	Low cost using an established system, unlike drones





WHERE ARE WE NOW?

Academy of Robotics' autonomous vehicle technology is in use by some of the largest organisations in the world.

Kar-go's Vision System

Our vehicle's AI-powered vision system is being used within the construction industry. Identifying potholes as it drives, Kar-go helps to pre-emptively detect emerging faults in the road surface.

Autonomous Delivery

Using a combination of Athena, our Mobile Command Hub, together with our AV, Kar-go, the Royal Air Force was able to deploy a last-mile delivery solution on the largest airbase in the UK, RAF Brize Norton.

Advanced Robotics

The core of self-driving technology is the ability to move from A-B autonomously, while avoiding obstacles. Our technology was transferred to be used, not just on vehicles, but also on mobile robots, helping to move essential items from A-B indoors.





ACADEMY OF ROBOTICS' HQ

- HQ in the United Kingdom allowing all production and IP to remain in the UK
- 26 acre commercial site with private test track already acquired
- 20 000 square foot turn-key production facility
- Ability to hold thousands of staff
- Staff accommodation for hybrid work
- Existing leisure facilities for staff including a gymnasium, tennis and squash courts





REVENUE STREAM

PHASE 1

“Autonomous Vehicle Technology As A Service”

We save corporations the time and cost associated with developing autonomous vehicle technology on their own.

Our current model works as follows:

Single on-boarding fee £50,000

Vehicle cost per month £2,500

Tech licensing £2,500

This means up to £1 million per client per year

(end of year 2 revenue is circa £20million a year)

Modelled on 1 command hub and a fleet of 10 cars

PHASE 2 & 3

“Autonomous Vehicle Software As A Service”

As companies acquire electric and autonomous vehicles, from us or from third parties, our revenue model changes to only charge for the software as a service.

This is because our technology is designed to be implemented into any electric vehicle fleet.

Vehicle cost per month £750

Tech licensing £2,500

These revenue streams are tested and proven.

(Tesla currently charges an additional \$10,000 for a full self-driving software update to existing Tesla owners)





A PEEK UNDER
THE HOOD

KAR-GO

TECHNOLOGY





PRODUCT SPECIFICATION

We design our **own hardware**: this includes the vehicle sensors and circuit boards.
We design all the software, vision system and **Intellectual Property**.

Sensor suite

- 6 cameras (incl 3 stereopairs), Time-of-flight cameras, Ultrasonic obstacle detector, Vehicle detection radar & IR custom Kar-go developed sensors. Detection range 60m

Communications & processor

- Proprietary Hardware
- GPS, IMU

32 Proprietary micro-processor boards and sensors

Drive-train

- 4 wheels, two-wheel drive, Electric Motor
- Custom designed suspension, Max speed 60 mph, 2 X 48 volt batteries
- Fast Charging
- Regenerative Braking

Body

- Glass or Carbon Fibre
- Available in different colours
- Power tailgate with electromechanical lock
- Length 3.6 metres.

Width 1.7 metres.

Software

- Proprietary navigation, localization, and self driving operating system
- Proprietary child detection system, GPS and IMU
- Navigation accuracy 5cm
- Built-in obstacle avoidance and emergency stop procedures
- Remote operator to manage difficult situations.
- Proprietary Bio-inspired neural networks using long and short term memory based decision making





SOCIAL ACCEPTANCE

Testing shows up to 98% positive reactions.

When **KARGO** is on the road, people will come out of their houses in rain or snow to take a photo and get very excited about the future.

KARGO is particularly popular with kids and younger people.

Negative reactions are often associated with the loss of people's jobs, but we believe driver shortages and supply chain challenges are changing attitudes.

Social media posts of **KARGO** out on public roads have gathered tens of thousands to millions of views in the space of a few days.





THE WIZARDS
BEHIND THE MAGIC

MEET THE TEAM





OUR TEAM

Our senior team brings together people with expert knowledge who have reached the highest levels of education or experience in their fields. From award-winning vehicle designers to a team of PhDs in artificial intelligence and engineering.

Together, we were able to design, build and get an autonomous vehicle product to market before any of the large tech or car companies.



Dr Elio Tuci

Currently a professor with 5 book chapters in A.I

89 papers peer-reviewed



Jill Lloyd

Former Yahoo! PR, Expedia PR, WorldRemit PR.



Paul Levene

Embedded Systems Architect

14 years experience



Dr Aparajit Narayan

A.I PhD

3 A.I Software Patents filed



Paul Burgess

Award winning McLaren Designer

Award winning F1 Car Designer



William Sachiti

3 Company Exits
14 tech patents filed

AI and Robotics Expert





SUMMARY OF TRACTION

- **Europe's** first street-legal autonomous delivery vehicles
- **Approved** for use on UK roads by the DVSA and registered by the DVLA in November 2020
- **Developed** and launched the UK's first autonomous vehicle Command Hub for real-time autonomous fleet support
- **Cited** by Richard Branson & Virgin as one of the companies to watch in the autonomous car space.
- **Part** of NVIDIA's Inception Incubator
- **Named** one of the UK's top start-ups to watch by London & Partners and by Sifted (part of the FT)
- **Several** appearances on TV and covered by hundreds of publications including BBC, FT, Daily Mail, CNN and Reuters
- **Over** 14 hardware patents filed around autonomous navigation and autonomous delivery
- **3 software** patents filed including a new type of vision system costing a fraction of the traditional cost
- **Currently** on the road in the UK making semi-autonomous deliveries
- **Funded** by the UK government after being identified as current state-of-the-art in autonomous vehicle technology
- **Signed** agreements with some of the largest organisations in the world.





THE IMPORTANT SLIDE

Acquisitions and Investments last 12 months

These are some of the self-drive start-up acquisitions which happened in the last 12 months. None of these start-ups were in profit and some did not have a product on the road yet.

Wayve

UK self-drive start-up received £200 million funding from Virgin, Microsoft and Bailey Gifford.

Velodyne Lidar

Self-drive technology start-up.
\$3.9 billion Nasdaq listing.

Mobileye N.V.

Self-drive vision technology start-up continues to grow since \$15 billion Intel acquisition.

Zoox

Acquired by amazon for \$1.2 billion.

Lyft

Self-drive start-up acquired by Toyota for \$550 million.

Nuro

Self-drive delivery start-up raised another \$600m on top of \$1.5 billion at \$8.6 billion valuation.

We are currently in discussions with American firms with a view to get our company a potential Nasdaq listing or exit within the next couple of years.





“Autonomous delivery vehicles, such as **KARGO**, can offer safer and speedier delivery of medical supplies to those who need it the most.

“The UK is well-placed as a science superpower to lead the world in this area and I’m delighted to support projects that drive green innovation, promote a clean transport future and help the economy.”

UK Transport Minister, Rachel Maclean





(£3 MILLION ALREADY PLEDGED)

ACADEMYOFROBOTICS.CO.UK/INVESTORS

The company has so far been funded by business angels. Anyone can invest, accepting pledges from £5K- £5 million per ticket. Visit the link above to join our current investment round.

Customers Include:



Investors include:



UK Government



INDUSTRIAL STRATEGY

UK Research and Innovation

