



MassiveAnalytic
The Precognition Company
www.massiveanalytic.com



AFTOS
ROBOTICS

Development Opportunity with Massive Analytic's Artificial Intelligence Product **Aftos: Robotics "AI-on a-chip"**

Massive Analytic Limited is seeking chip design partners for Aftos:Robotics - its "AI-on-a-Chip" patented technology. The aim is to develop an onboard integrated artificial intelligence system for next-generation highly-connected (autonomous) vehicles, enabling on-the-fly management, automated control and optimisation of data from vehicle sensors and systems. This technology will provide the fundamental basis for network intelligence and macro intelligent control at city level and is based on Massive Analytic's patented AI technology Artificial Precognition.

The car will communicate with many entities for many purposes

Car data users/contributors and selected use case examples

Driver, passengers

(Via personal and/or wearable devices)

- Telecommunications (telephone, SMS, e-mail)
- Audio applications/traffic information
- Handheld/portable navigation)

OEM (and dealer)

- Remote onboard diagnostic and preventive maintenance
- Enhanced product design through "field-data" recovery (actual user data)
- Accurate warranty management system

Other cars

- Rolling map network
- Safety systems (i.e., pre-collision warning thanks to data from other cars)
- Automatic cruise control (incl. lane/distance keeping)

Service providers

- Contents streaming (e.g., audio, video, news, weather)
- Direct mobile payments Pay-as-you-drive (PAYD) insurance
- Reservations/concierge services

Mobility providers

- E-hailing services (for cars, LCVs) services
- Vehicle sharing
- Public transport hubs (for integrated mobility)

Authorities

- Emergency and breakdown calls
- Law enforcement (for police)
- Vehicle-data-based road maintenance

Infrastructure

- Automated road toll/taxation system
- Average speed monitoring systems
- Traffic flow management and monitoring systems

"High-tech giants" and suppliers

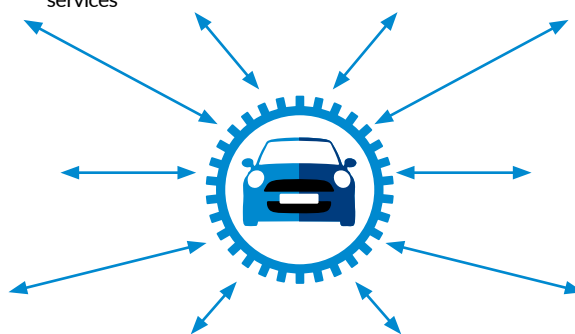
- Maps
- Targeted advertising
- Contents streaming (e.g., audio/video)

Retailers

- In-car offerings and targeted advertising
- Proximity/customers flow data analytics for store location, opening hours optimization

Home and workplace

- Remote appliances and IT systems operation
- Automated customer log-in from the car and self-recharging/refuelling (e.g., in garage)



[Article focus is on data generated during customer use 1 of a vehicle]

SOURCE: McKinsey

The Concept and the Solution

A single connected autonomous vehicle can currently harvest over 4,000GB of data daily. However, the vast majority of this cannot be communicated beyond the vehicle on-the-fly due to bandwidth limitations of V2X communications, as well as the characteristics of the actual data in terms of:

- Granularity of data signals from incumbent sensors/data management approaches
- Data mass
- Data noise, in particular the aggregation of noise from sensor fusion and across different data levels

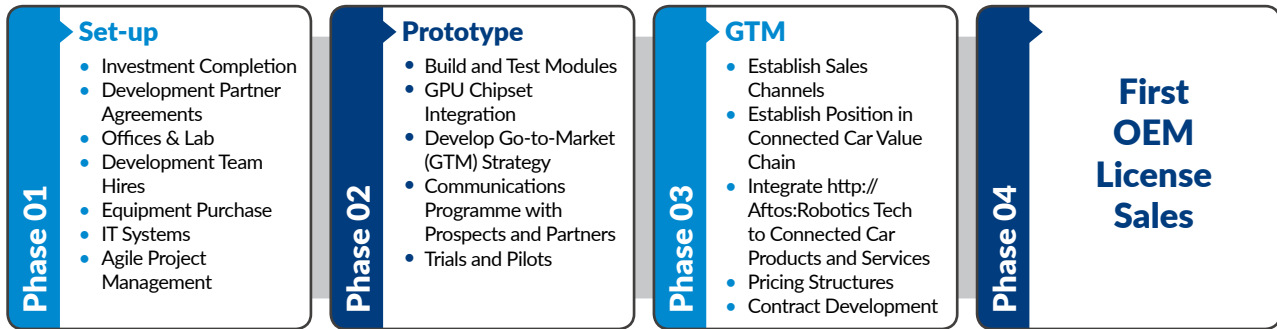


Critical Elements of Aftos:Robotics Technology

The proposed architecture will consist of the following core subsystems:

- **AI chipset:** Obtained commercially, or via partnership with a hardware developer.
- **Data processing compression module:** obtained commercially.
- **Automated data analytics:** based on Oscar: Data Science, implemented on a chipset for on-board analytics.
- **Automated data optimisation:** Integrated as an optimisation-layer into Oscar building on adaptive (model) cognized control (APACC), adaptive control at data-level which will underpin functionality (network intelligence) for location analytics.
- **Connection to infrastructure:** Based on High Speed Computing (HPC) architecture and infrastructure.
- **Connection to in-car technology:** Currently undeveloped but presents opportunity to leverage collaborations with vehicle OEMs.

Bringing Aftos:Robotics Patented Technology to Market



Aftos:Robotics - Patented Artificial Intelligence Innovation

Artificial Precognition is the AI behind our Artificial Intelligence Trifecta of Oscar, Nethra and Aftos. Massive Analytic Limited has patented Artificial Precognition in over 20 countries (including the United States, China and Israel) with more pending. As an AI on a chip technology Aftos:Robotics is the purest application of the patents. Artificial Precognition uses Adaptive (model) Cognized Control (APACC) to increase signal to noise ratios on data and provide a new level of inferential thinking and real time communication for connected vehicles. It achieves this by blending together complex machine learning algorithms, including deep learning and possibilistic classifiers such as fuzzy logic and decision trees.

APACC makes sense of the wealth of data generated by in-vehicle cameras, sensors, Advanced Driver Assist Systems (ADAS), Light Detection and Ranging (LIDAR), and dedicated short-range communication (DSRC). This data is combined in real-time with driver behaviour, environmental concerns (e.g. weather, road condition, traffic), maps and images stored on the onboard AI chipset for onward transmission to a High Performance Computing (HPC) data centre. In connected cars with the fusion of this vast amount of data APACC provides

the capability to “cognize” the vehicle’s surroundings, giving a genuine 3D perception of the external environment. APACC goes far beyond what has until now been possible by mimicking the way humans use a combination of stored memories and sensory input to interpret and respond to events as they occur, and even anticipate (cognize) likely scenarios.

The APACC for Guidance, Navigation and Control (GNC) of the land vehicle requires the virtually instantaneous analysis of enormous data volumes generated by the vehicle to vehicle and vehicle to infrastructure technologies. To achieve this, the onboard AI chipset provides very fast access to memory to run the complex functions used in APACC. The result is a unique and ground-breaking solution to the challenges surrounding connected vehicles.

Further Applications

There is broad applicability of this technology, including people movement analytics for smart cities, infrastructure analytics and ecosystem analytics. Location analytics and connected vehicles have been chosen as the initial proof point for the developed technology.

AI chipset

Obtained commercially, or via partnership with a hardware developer

Connection to infrastructure:

Based on CitiAnalytics architecture and infrastructure.

Automated data optimisation

Integrated as an optimisation-layer into Oscar DS, building on MAL’s adaptive control patents at data-level which will underpin functionality (network intelligence) for location analytics

Data processing compression module.

Connection to in-car technology

Automated data analytics

Based on Oscar DS, implemented on a chipset for on-board analytics

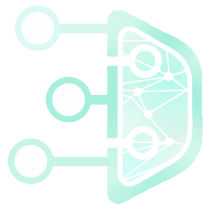


MassiveAnalytic

The Precognition Company

Massive Analytic Limited is an innovator with deep and unique IP at the intersection of data science, machine learning and artificial intelligence. With patented world leading Artificial Precognition technologies, Massive Analytic's mission is to raise productivity and digitally transform businesses by automating the processes required to get insights from data. The company's vision is to become the global category leader for the way people interact with data and control machines with its products

Oscar:DataScience, Nethra:VideoAnalytics, and Aftos:Robotics.



OSCAR

DATA SCIENCE

Oscar is an AI Software as a Service data science platform which enables a wide range of Users to make sense of Big Data.



NETHRA

VIDEO ANALYTICS

Nethra uses AI deep learning to analyse live and batch video to identify objects and predict events before they occur.

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Massive Analytic offers fully DP compliant solutions. Global data protection and privacy rules for Registered User information are known, recognized, applied and adhered to