AUTONOMOUS SHARED MOBILITY & THE CITIES OF TOMORROW

IMPACT OF SHARED SELF-DRIVING VEHICLES ON THE URBAN FORM OF THE CITY OF AMSTERDAM

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MSC TRACK URBANISM

GRADUATION STUDIO COMPLEX CITIES
2017-50%
2025-58%
2040-63%
Today 1.2 billion

2040 2.4 billion
AUTONOMOUS SHARED MOBILITY & THE CITIES OF TOMORROW

IMPACT OF SHARED SELF-DRIVING VEHICLES ON THE URBAN FORM OF THE CITY OF AMSTERDAM
A laser sensor with 360 degree view and a range of 600ft.

A radar to assess the speed of the vehicle in front.

A windscreen made from plastic instead of glass.

A front made from soft foam to lessen any potential collisions with pedestrians.

A powerful processor to regulate the car's activity as part of the network.

A sensor in the wheels to detect vehicle rotations and establish location.
Levels of Autonomous Technology

L1: Driver Control
L2: Vehicle Control
L3: Connectivity
L4
L5
Less Dependence on cars
Fewer cars on the road
Safer Multitasking
Increased Productivity
More Energy Efficient
Increased Safety
Fewer Cars on the Road
Less Dependence on Cars
A CHALLENGE?

POLICIES  INSURANCE  LICENSING  URBAN PLANNING  LAWS AND LEGISLATIONS  SOCIAL ACCEPTANCE
High prices of parking  Low prices of parking

CAR BICYCLE PUBLIC TRANSPORT WALK OTHERS
Declaration of Amsterdam

Cooperation in the field of connected and automated driving

14-15 April 2016
GOALS

DENSIFY
TRANSFORM
PUBLIC TRANSPORT ON REGIONAL SCALE
HIGH QUALITY LAYOUT OF PUBLIC SPACE
INVEST IN RECREATIONAL USE OF GREEN SPACE AND WATER
CONVERTING TO SUSTAINABLE ENERGY
OLYMPIC GAMES, AMSTERDAM 2028

ACTIONS

THE ROLL-OUT OF THE CITY CENTRE
THE INTERWEAVING OF THE METROPOLITAN LANDSCAPE AND THE CITY
THE REDISCOVERY OF THE WATERFRONT
THE INTERNATIONALIZATION OF THE CITY’S SOUTHERN FLANK
POTENTIAL REDEVELOPMENT ZONES SUGGESTED BY AMSTERDAM 2040

- Current residential Zones
- Future Residential Re-development
- Future Business Re-development
- Business Re-development
- Public Spaces Re-development
- Potential public squares
- Streets for Re-development
Nodes - Mobility
- central node
- train nodes
- metro nodes
- tram nodes

Nodes - Parking
- concentration of bike, taxi, municipal, parking garages
- concentration of municipality garages for parking

Nodes - Technology
- central node
- charging spots
- wifi spots

MOBILITY
PARKING
WI-FI AND CHARGING NODES
HOW DO WE PLAN FOR THE FUTURE?

SCENARIO DEVELOPMENT STUDIES

BACKCASTING
How can scenario development studies be used as a tool to formulate a strategy to transform the urban form of the city in the age of developing technology of autonomous shared vehicles?
BACKCASTING VIEW

UPTIL 2017
CURRENT SITUATION
UPTIL 2017
LOW SHARING
LEVEL 1 TO LEVEL 3

2025
THE RIGHT MIX OF EVERYTHING
HIGH SHARING
LEVEL 1 TO LEVEL 3

2040 AND BEYOND
LUXURY RIDE
LOW SHARING
LEVEL 4 AND ABOVE

2040 AND BEYOND
CAR ON DEMAND
HIGH SHARING
LEVEL 4 AND ABOVE
Urban form travel behaviour facilitate technological advancements change transform facilitate
POSSIBLE FUTURES  STRATEGY  IDEAL FUTURE  GUIDELINES  RECOMMENDATIONS  LIFE IN 2040
**GOALS**
- **Density**
- **Transform**
- **Public transport on regional scale**
- **High quality layout of public space**
- **Invest in recreational use of green space and water**
- **Converting to sustainable energy**
- **Olympic Games Amsterdam 2028**
- **Upgrading current infrastructure to adapt to autonomous vehicles**

**ACTIONS**
- **Adapting a proactive role in the development of ASV’s**
- **The roll out of city center**
- **The interweaving of metropolitan landscape and the city**
- **The rediscovery of the waterfront**
- **The internationalization of the city’s southern flank**

**Vision**
- Current residential zones
- Potential zones for the development of ASV
- Potential industrial zone for the development of ASV
- Potential green spaces
- Potential public squares
- Potential streets for the development of ASV
- Planet car network
Proactive Approach for Amsterdam 2040

Stakeholders
- National Government
- Infrastructure Providers
- Local Government
- Businesses/Institutions
- Public Transport Authorities
- Vehicle companies/Sharing Platforms
- National and Local Citizens
- Autonomous Vehicle companies

Actions
- Infrastructure and Technology
- Roadways
- Multimodal transport facilitation
- Land-Use Changes
- First and last mile
- On Demand services
- Bringing together Infrastructure and Technology connectivity
- Adapt to the changing mobility trends
- Contribution to Sharing Economy
- Decision making for small scale interventions
- Proactive Approach for Amsterdam 2040

Strategic Mobility Plans for future information systems
- Communications systems
- Land and Water transport
- Rail and Bus Public transport
- Proactive Approach for Amsterdam 2040

Incentives for shared service of personal vehicles
- Policy recommendations to discourage car ownership
- Integration with other modes of mobility and favour shared ownership of vehicles
- Encourage existing shared mobility initiatives e.g., Car and ride sharing
- Awareness
- Parking Policies
- Licensing and Testing
- Businesses
- Public Transport Authorities
- Vehicle companies/Sharing Platforms
- National and Local Citizens
- Infrastructure Providers
- National Government

Rules and Regulations
- Insurance
- Safety
- Transport Bylaws Revision
- Policies
- Licencing and Testing
- Cyber security
- Information systems
- Communications systems
- Connectivity
- Proactive Approach for Amsterdam 2040

Vehicle Size and fleet management technology
- Technological innovation
- Insurance
- Safety
- Transport Bylaws Revision
- Policies
- Licencing and Testing
- Cyber security
- Information systems
- Communications systems
- Connectivity
- Proactive Approach for Amsterdam 2040

Planning of PT infrastructure
- Integrated Fare System
- Management
- Finance framework
- Vehicle to Vehicle communication technology
- Vehicle to Infra structure communication technology
- Proactive Approach for Amsterdam 2040

Awareness
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BACKCASTING VIEW

UPTILL 2017
CURRENT SITUATION
MINIMUM SHARING
NO AUTONOMOUS
TECHNOLOGY

2025
THE RIGHT MIX OF EVERYTHING
HIGH SHARING
LEVEL 1 TO LEVEL 3

2040 AND BEYOND
CAR ON DEMAND
HIGH SHARING
LEVEL 4 AND ABOVE
CO-OPERATION OF PUBLIC TRANSPORT AUTHORITIES AND THE AUTONOMOUS CAR COMPANIES IN TERMS OF CREATING INTEGRATED MOBILITY HUBS

STRONG MOBILITY BUSINESS MODELS

ESTABLISHING IMPROVED MULTI-MODAL TRANSPORTATION SOLUTIONS IN THE TECHNOLOGY

PUBLIC AWARENESS AND ACCEPTANCE

REGULATIONS ON ROAD USER AND PARKING CHARGES

POLICIES AND REGULATIONS TO PROMOTE NEW FORMS OF PUBLIC-PRIVATE COLLABORATION

INCENTIVES AND INITIATIVES TO ENCOURAGE SHARING ECONOMY
Flexible spaces
Technology friendly
On street parking to on street parklets
Decultter the streets
Repourposing existing car parks
Integrate multiple activities in a safe environment
Decultter the streets
Repourposing existing car parks
DEVELOPMENT OF AUTONOMOUS PUBLIC TRANSPORT

BICYCLE SHARING PROGRAM

FLEET OF LIGHT WEIGHT AUTONOMOUS VEHICLES
FLEXIBLE INFRASTRUCTURE
PARK+RIDE+CHARGE
POP UP PUBLIC SPACES
SHARED SPACES
PRIORITY LANES
HOP IN - DROP OFF ZONES
MULTIMODAL HUBS
Albertdingk Thijmstraat
Interior neighborhood street

Oude Haadseweg
Park & Ride, Charge station

Eerste Constantijn Hugensstraat
Main neighborhood street

Moermaskkade
Upcoming hot spot
Amsterdam Centraal
Oude Haadseweg
Park+Ride+ Charge station
Flexible spaces
Technology-friendly
Deciduous the streets

Strong mobility
Business models
Public awareness and acceptance
Policies and regulations to promote new forms of public-private collaboration
Incentives and initiatives to encourage sharing economy
Regulations on Road User and Parking Charges
Establishing improved multi-modal transportation solutions in the technology
Co-operation of public transport authorities and the autonomous car companies in terms of creating integrated mobility hubs

ESTABLISHING IMPROVED MULTI-MODAL TRANSPORTATION SOLUTIONS IN THE TECHNOLOGY

REGULATIONS ON ROAD USER AND PARKING CHARGES
Approximately 40% space saved from onstreet parking

Priority lanes dedicated to autonomous public transport

Vehicle pick up and drop off area

Wi-Fi enabled autonomous public transport stop
HIGHLY SENSITIVE SENSORS TO DETECT VEHICLE LEAVING A SPOT OR ARRIVING AT A SPOT

MULTIMODAL INTEGRATION

WIFI ENABLED DIGITAL INTERACTIVE AUTONOMOUS PUBLIC TRANSPORT STOP

INTEGRATED MULTIMODAL APP

DIGITAL GUIDANCE DISPLAYS ON HIGHWAYS FOR BETTER NAVIGATION OF ALL THE MODES OF TRANSPORT

VEHICLE PICK UP AND DROP OFF AREA

P+R+

CHARGE NOW

SLOT NO. 8 FREE

P+R+

PICK UP NOW

CHARGING

COMPLETE
Amsterdam Centraal
Eerste Constantijn Hugensstraat
Main neighbourhood street
Strong mobility business models

Public awareness and acceptance

Policies and regulations to promote new forms of public-private collaboration

Incentives and initiatives to encourage sharing economy

Regulations on Road User and Parking Charges

Establishing improved multi-modal transportation solutions in the technology

Co-operation of public transport authorities and the autonomous car companies in terms of creating integrated mobility hubs

Flexible spaces

Technology

Friendly

On street parking to on-street parklets

Deculture the streets

Repurpose existing car parks

Integrate multiple activities in a safe environment to demonstrate the coexistence of various activities along with modes of transport
Fleet of on demand lightweight vehicles

Bike Sharing Program - Bike Rack

Interactive Digital Information Display

Wepods - Autonomous Shuttle Buses

Shared Streets

Hop in Drop Off Spots
FARMERS MARKET - FLEXIBLE USE OF SPACE
PROACTIVE APPROACH IN MOBILITY FOR AMSTERDAM 2040

- Equitable
- Sustainable
- Proactive Approach in Mobility for Amsterdam 2040
- Efficient
- Robust
- Quality of Space
- Safe
- Accessible
- Transport as a Backbone
- Sharing Trend
- Public and Private Co-operation
- Policy and Regulation Driven Management of Mobility
- Responsibility and Resources of the Government
- Strong Mobility Business Models
- Mobility and Innovation