



CityMobil2: Automated Road Transport Systems

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Few questions (and suggested answers) on road vehicle automation

- ➔ When will fully automated private cars be available?
 - ➔ depends on what we mean but level 5 is expected in few decades
- ➔ Will they help increasing road capacity?
 - ➔ Yes but only with platooning
- ➔ Will they help reduce safety and environmental impacts?
 - ➔ ... hum ... depends on the effect they will have on occupancy rates

Are we so sure automated cars will be “for the greater good”?

➔ Yes if

- ➔ complementing and not out-phasing public transport
- ➔ they will feature and encourage ride-sharing
- ➔ they will be centrally supervised (something like an air traffic control) to allow (or not) a trip on path depending on traffic intensity to avoid congestion

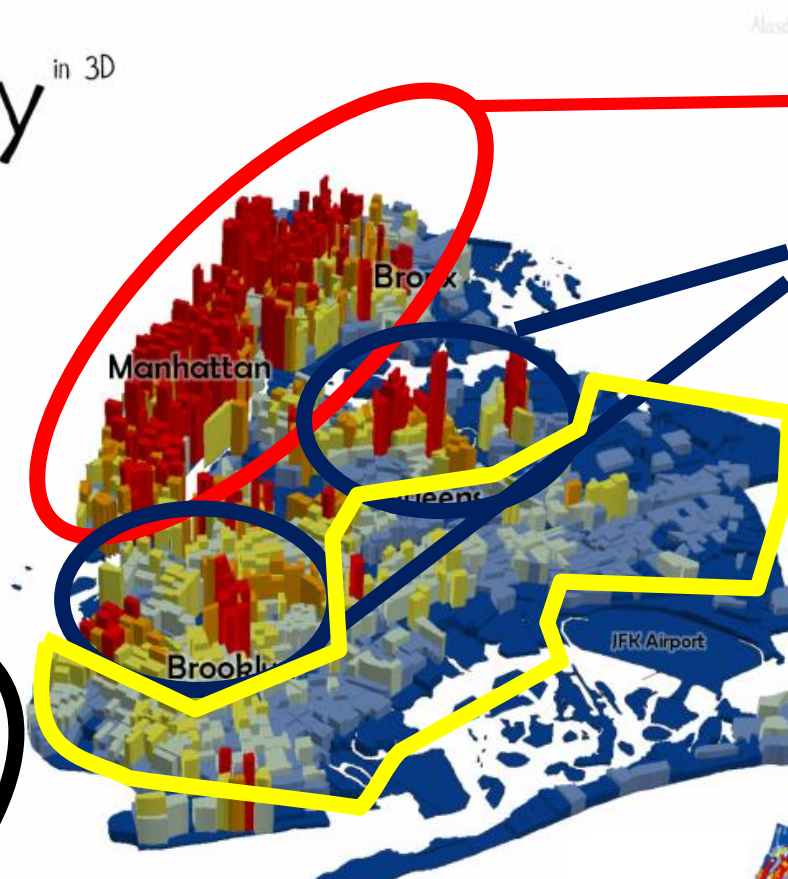
Let's try to put automated vehicles in NYC

New York City in 3D

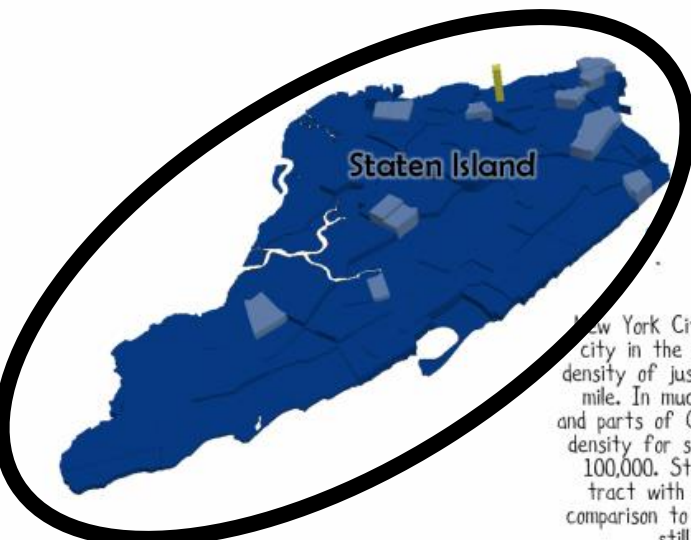
Census tract population density, 2010

Population - 8,175,133 Source: 2010 Census

- > 100,000 people per square mile
- > 80,000 people per square mile
- > 60,000 people per square mile
- > 40,000 people per square mile
- > 20,000 people per square mile
- 0 - 20,000 people per square mile



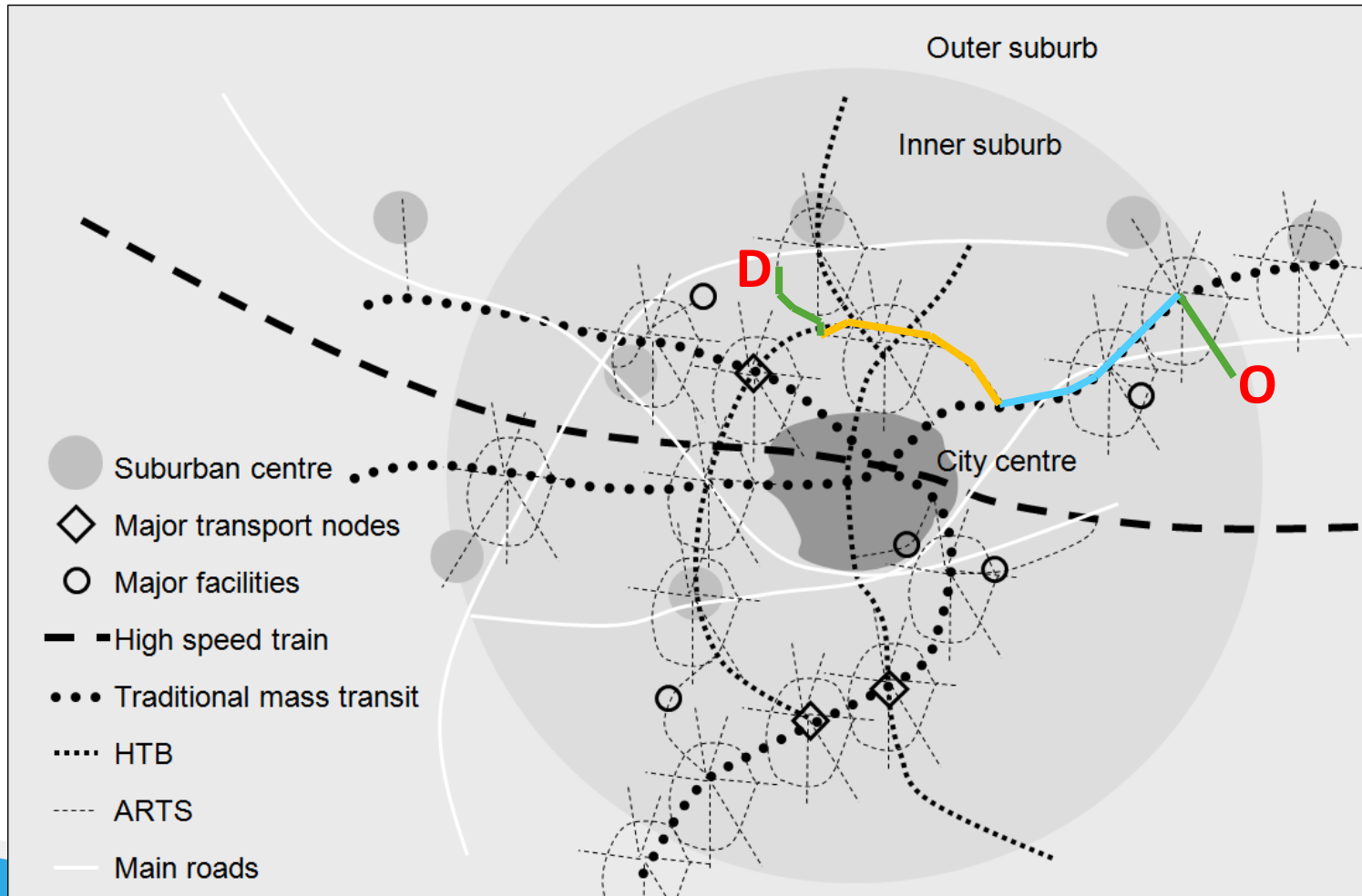
Mix of shared and individual a-taxis for last mile to and from other parts of the city and for inner zone trips



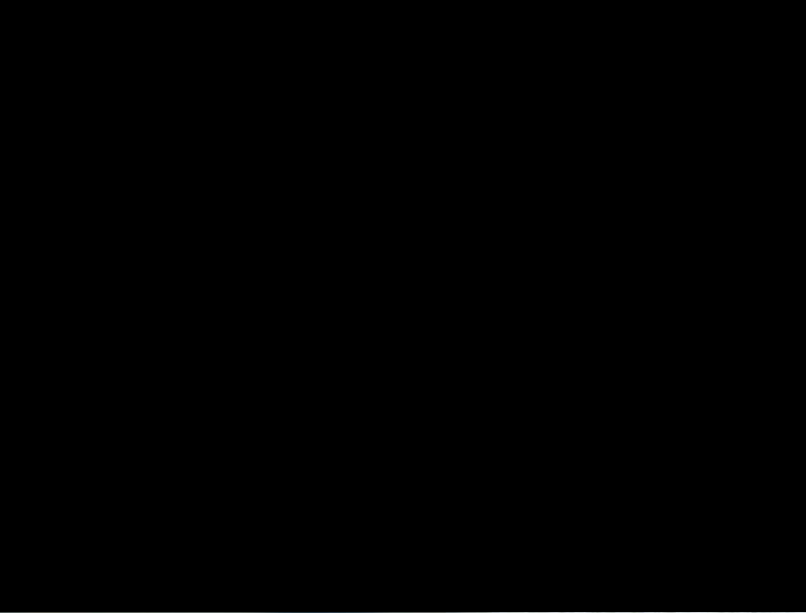
New York City is the most densely populated city in the United States with a population density of just under 100,000 people per square mile. In much of Manhattan and parts of Queens, the density is over 100,000 people per square mile. Staten Island has a population density of about 100,000 people per square mile, a density that is still very high.

Whatever, even automated private vehicles are OK

We conceived ARTS for complementing and integrating mass transits



CityMobil2 succesful demonstrations



CityMobil2 successful demonstrations proved

- ➔ Automated road transport systems can be a reality today
 - ➔ 43 200 total passengers ... and counting
 - ➔ 84% of the interviewed riders would like to see them implemented as complement to mass transit
 - ➔ 71% would like to see them implemented in the place of some bus lines

So we have 10-15 years

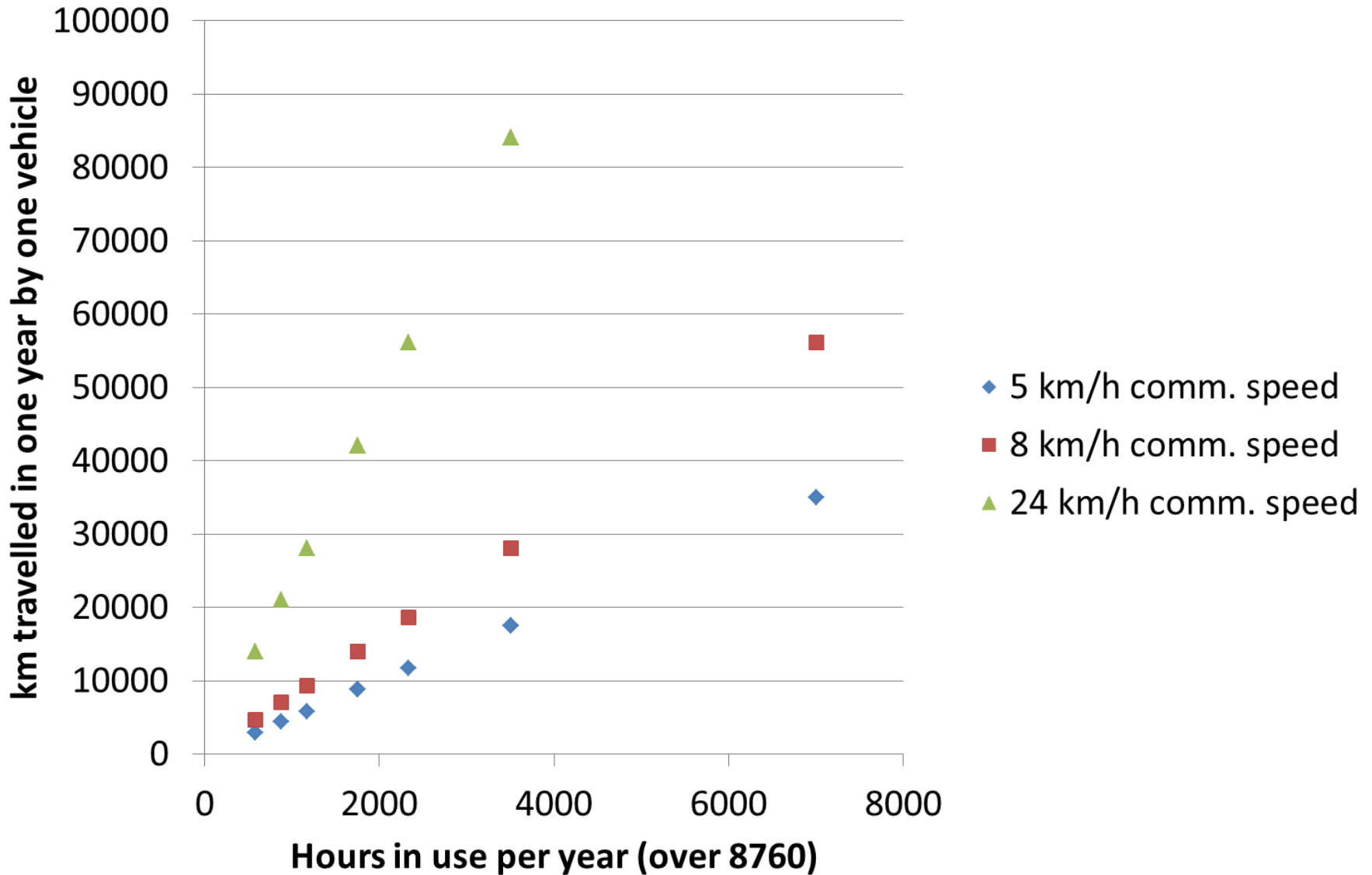
- ➔ To see ARTS implemented before automated private cars becomes available
- ➔ To find the right business model to have private investors willing to relieve governments from the needs of subsidising public transport
- ➔ To significantly reduce car modal share

Can ARTS be a successful business case?

Let's compare to cars and busses

	60-100 passenger bus	5 sit car very used often changed	4 sit car little used little changed	10 passenger automated minibus current prices	4 passenger automated car reduced price
Cost of a vehicle	€ 200,000.00	€ 30,000.00	€ 18,000.00	€ 100,000.00	€ 30,000.00
km per year	90000	40000	10000	25000	25000
occupancy rate (low)	5	1.2	1.3	0.65	0.65
occupancy rate (high)	25	1.2	1.3	3.5	1.4
Total cost per km	€ 2.12	€ 1.47	€ 4.94	€ 0.72	€ 0.27
Total cost per sit per km	€ 0.03	€ 0.29	€ 1.24	€ 0.07	€ 0.07
Cost per km excluding driver	€ 1.12	€ 0.34	€ 0.44	€ 0.72	€ 0.27
Cost per km per pax (low occ.)	€ 0.42	€ 0.28	€ 0.34	€ 1.11	€ 0.42
Cost per km per pax (high occ.)	€ 0.08	€ 0.28	€ 0.34	€ 0.21	€ 0.19

How to achieve such mileage?



Which solution for ARTS business?

- ➔ With
 - ➔ 14.5 km/h average commercial speed,
 - ➔ 5 days a week and 8 hours a day operations and
 - ➔ 35% occupancy rate
- ➔ the yearly mileage would be 30000 km/year and
- ➔ the cost per passenger kilometre 0.17 €/pkm
- ➔ Beating private cars (0.28-0.34 €/pkm) even with a 60% overhead to manage ARTS and have some company profits

What to do next then?

- ➔ Increase commercial speed
 - ➔ By mean of protected higher speed corridors
 - ➔ Which need also to be high capacity (therefore allowing platooning)
- ➔ Change the legal frameworks in most countries (a single one for Europe would be best)
- ➔ Do full scale permanent deployments



THANKS FOR LISTENING

