



City of Hamburg - Requirements

Robert Gaycken , ITS Hamburg 2021 GmbH

Virtual Conference – Urban Smart Park – 16.12.2020



 EIT Urban Mobility is supported by the EIT,
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City of Hamburg – Challenges

#1

Most congested cities in Germany (2019)

9 minutes

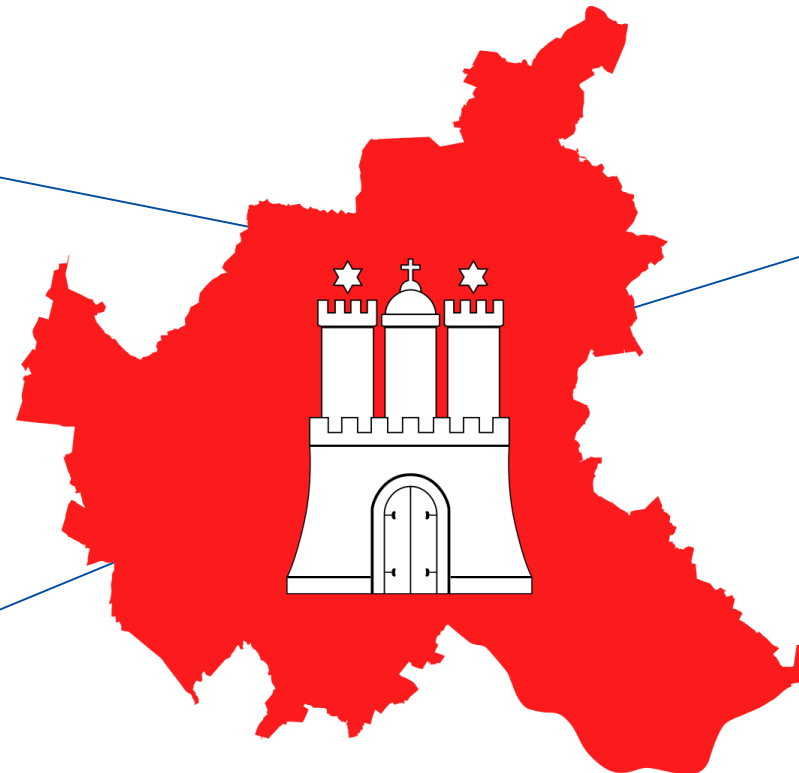
Avg. search for a free parking space in Hamburg

→ national average: 6 minutes (Inrix, 2017).

350.000+

Daily commuters into the city (2018)

→ 1/3 of all employees in Hamburg



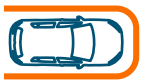
Expected increase in citizens:



2020
1.84 million



2040
ca. 2.05 million



City of Hamburg – Challenges

- Low number of available parking space in inner city leading to high number of illegal parking
 - Parking in second row
 - Blocking pedestrian walkway or cycle path
- Occupying of electric charging stations
 - Blocked by vehicles with conventional propulsion
 - Completely loaded electric cars



City of Hamburg – Goals

- Reducing parking violations
 - Increasing safety of bike & foot traffic
 - Reducing congestion
- Reducing motorized private transport
- Enhancing attractiveness of car-sharing services
- Reducing parking pressure & search time especially in city centre

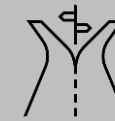


TAVF

Test track for automated and connected driving



City centre test course



Length:
9km

37

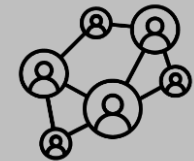
traffic lights with V2X-technology



- ITS-G5
- 4G LTE-A / 5G (planned)

Partners

- Siemens
- Swarco
- DLR...



Independent of specific OEMs

Source TAVF logo: <https://www.tavf.hamburg/>



Determining and Meeting the Need for Parking-Related Services

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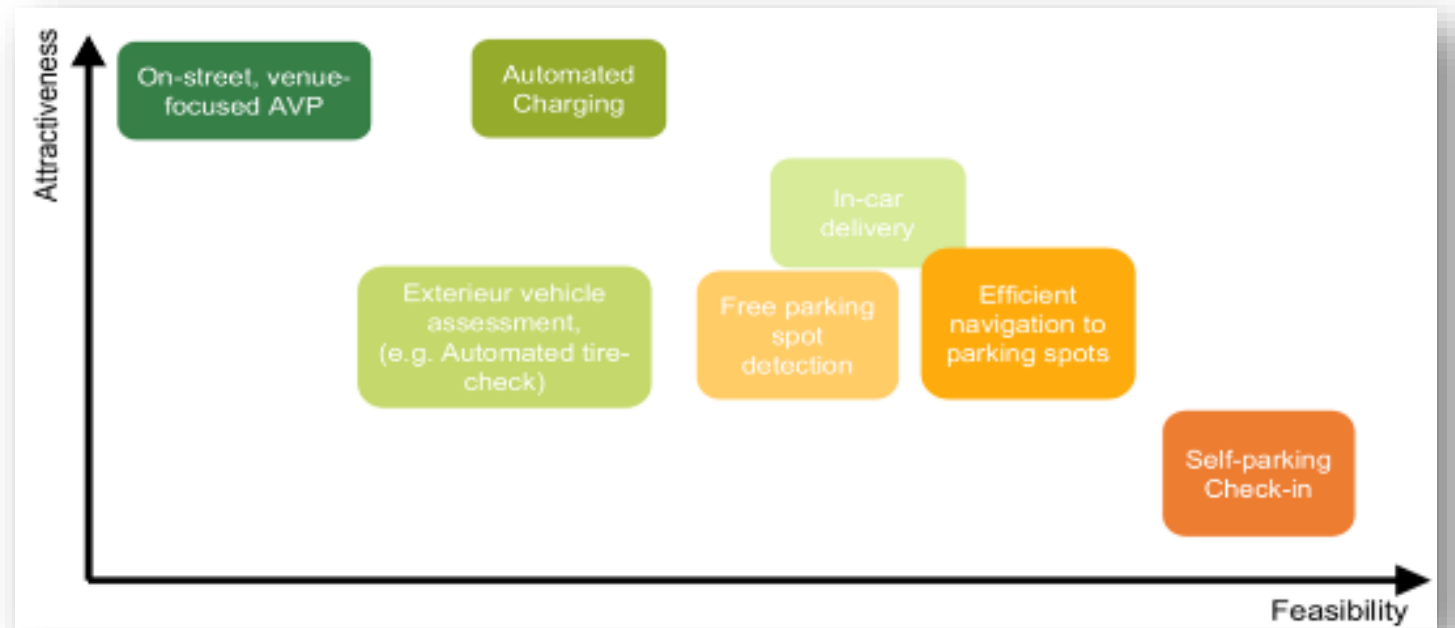
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City of Hamburg – Possible Use Cases

Step 1: Brainstorming sessions

- on basis of city requirements
 - City goals
 - legal requirements
- broad classification by
 - psychological & economical attractiveness
 - technical feasibility

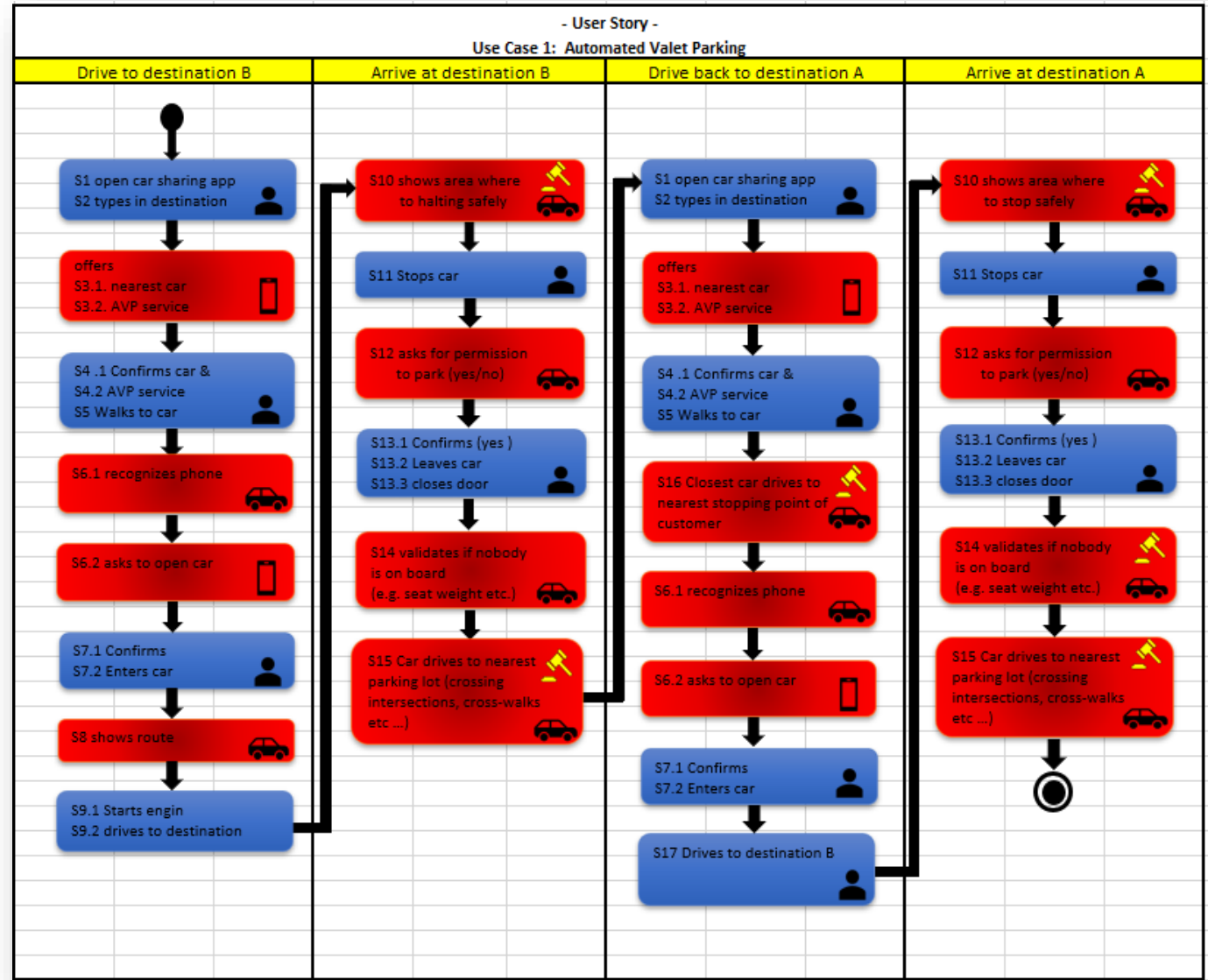


City of Hamburg – Possible Use Cases

Step 2: User Story

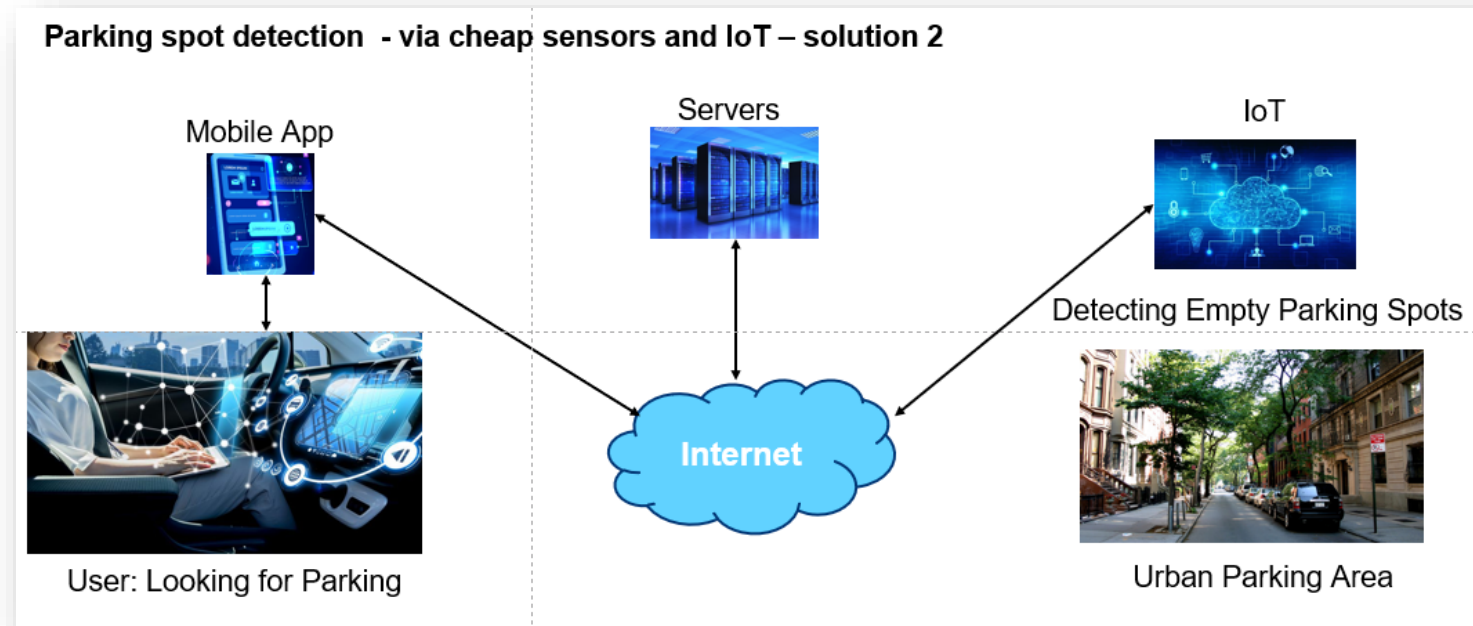
- In depth analysis of requirements / actions needed from
 - participants /users
 - technical equipment
 - legal issues ...

1. Describe your use case:		
1.1 identify stages in the process		
1.2 identify		
1.2.1 participants		
1.2.2 technical equipment		
1.2.3 processes that need legal analysis		
2. Define		
2.1 Start state		
2.2 Transitions		
2.3 End state		



City of Hamburg – Possible Use Cases

Step 3: Broad analysis of technical requirements



City of Hamburg – Possible Use Cases

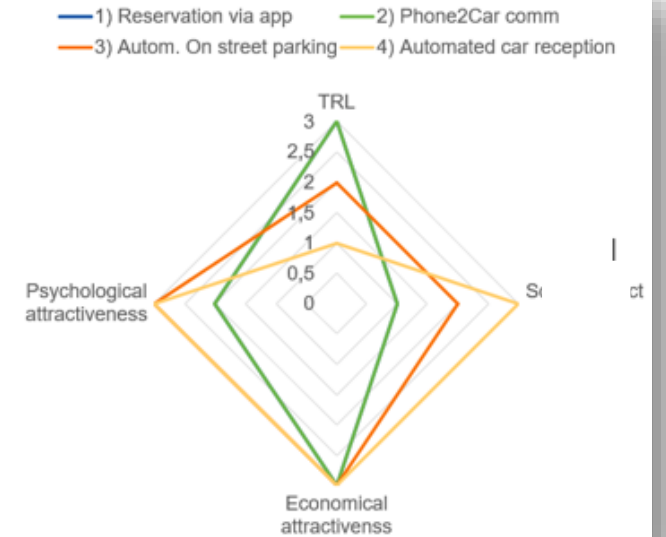
Step 4: Evaluation form

- TRL
- Social Impact (score)
- Economical & psychological attractiveness (score)

Task /Problem	Solution (Sol n)	Commercial idea /Hypothesis	Partners	Advantages / USP	
Which Task shall be accomplished?	What is the solution (Sol n) for Accomplishing the Task? (Fahrzeug, dass automatisiert einparkt und mich abholt)	Describe which part of the idea could be commercialized & how.	Describe Partners (see meeting cw 5)	What are the advantages compared to no services / other services (human AVP) (e.g. time & cost reduction, etc.)	
T1: Receiving a car on time	Sol1: Reservation of	Reservation of closest car via app. A one-off	Target Group (TG): End user Partner (P): OEM (Seat,	Advantages user: - convenience /planning security	
Impact on society level ((1) none, (2) low, (3) medium, (4) high)					
Increase of traffic safety	Decrease of environmental influence (e.g. emissions)	Safe data transmission	Degree of innovation	MEAN Impact on society	Technology Readiness Level
1	2	3	1	1,75	9

Assessing the solution along the main criterion The main scales: Low (1), Medium (2), High (3)

Criteria	1) Reservation via app	2) Phone2Car 2 open car	3) Autom. on street park	4) Autom. Recep. of car
TRL	3	3	2	1
Social Impact	1	1	2	3
Economical Attractivness (mean)	3	3	3	3
Psychological Attractivness (mean)	2	2	3	3



City of Hamburg – Possible Use Cases



Automated valet parking:

- Customer can order car via app
- Autonomous car picks up customer and drops him off at destination
- In future auton. vehicle drives to peripheral area in order to reduce parking pressure in e.g. inner city



Self-parking-check-in

- Mobile app containing vehicle, customer payment information
- Regulatory agencies/parking space managers are connected to the service platform
- Once car is parked in parking area, signal is given by smartphone or parking sensors in pavement
- Thus manual payment process and inspection is not necessary anymore



Automated charging

- Car autonomously parks at charging station
- After complete charging the vehicle clears the charging station for the next vehicle
- The charging stations are used more efficiently