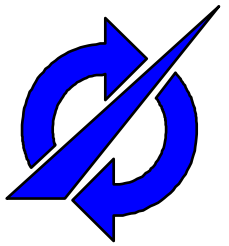

Intelligent Services for Context-Oriented Tourists Support in Karelia Region

Alexey M. Kashevnik

Laboratory of Computer Aided Integrated Systems

St. Petersburg Institute for Informatics and Automation of Russian Academy of Science (SPIIRAS)

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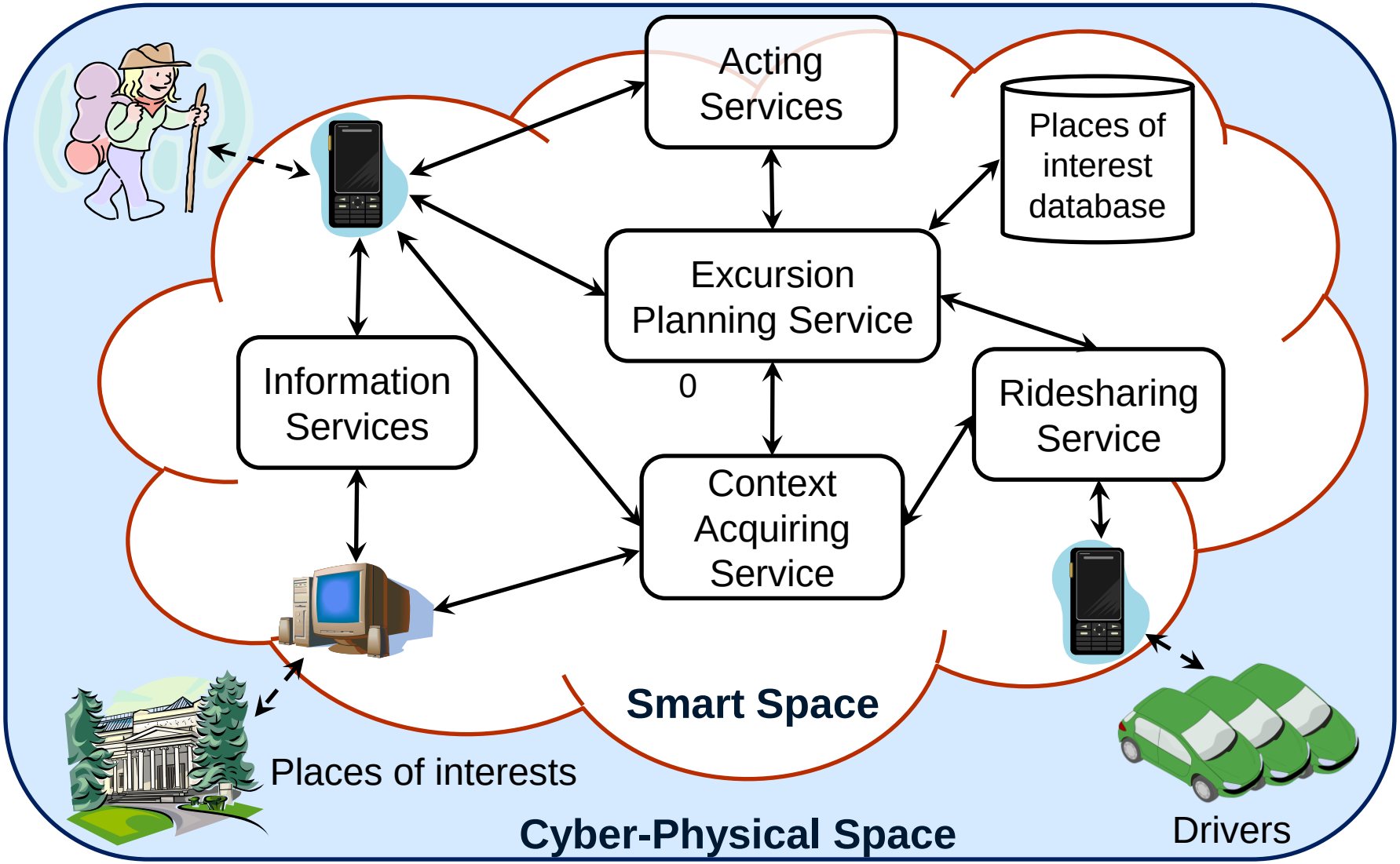
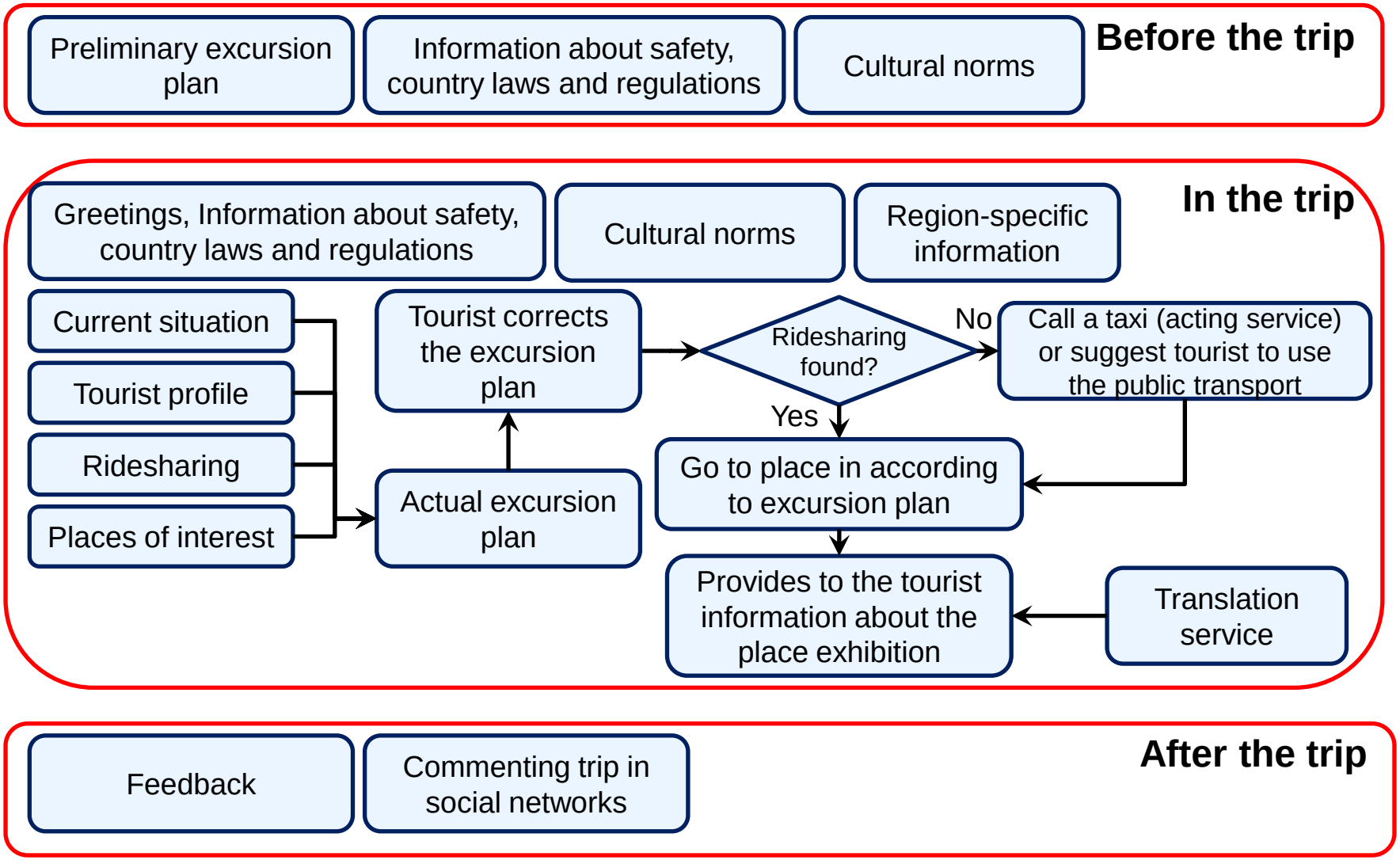
Some Major Touristic Problems in Karelia

- Information
  - Tourist greetings (e.g., police and ambulance phones)
  - Country laws and regulations
  - Region specific information (e.g.,how to use public transport in Russia)
  - Tourist safety
  - Etc…
- Transportation
  - Public transport
  - Taxi
  - Ridesharing possibilities
- Intelligent guides
  - Information about places of interests
  - Navigation in museums
  - Planning the best excursion for the tourist at the moment

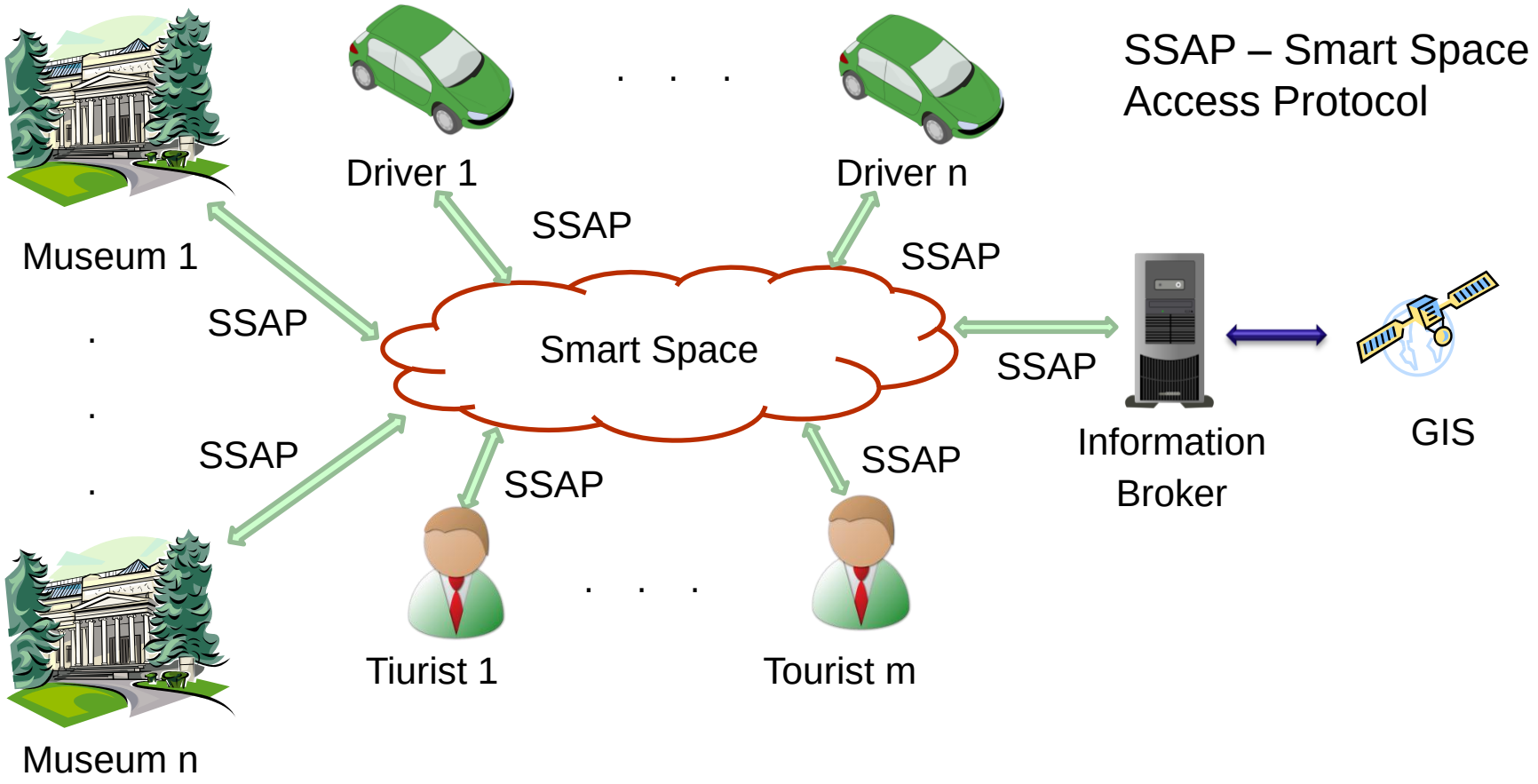
Architecture of Intelligent Tourist Support System



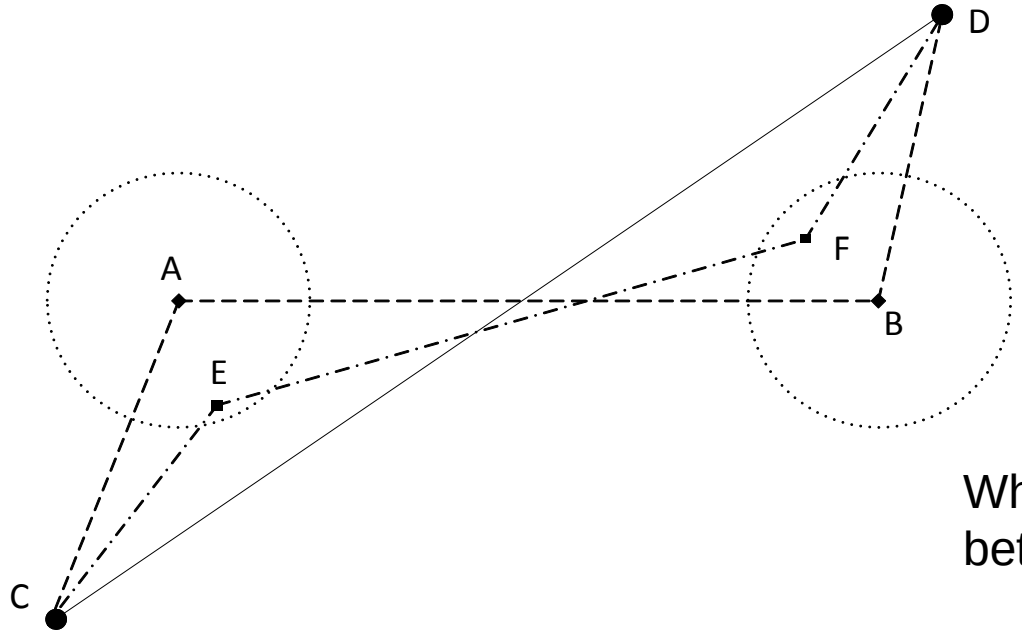
Intelligent Tourist Support System Scenario



Architecture of Ridesharing Service



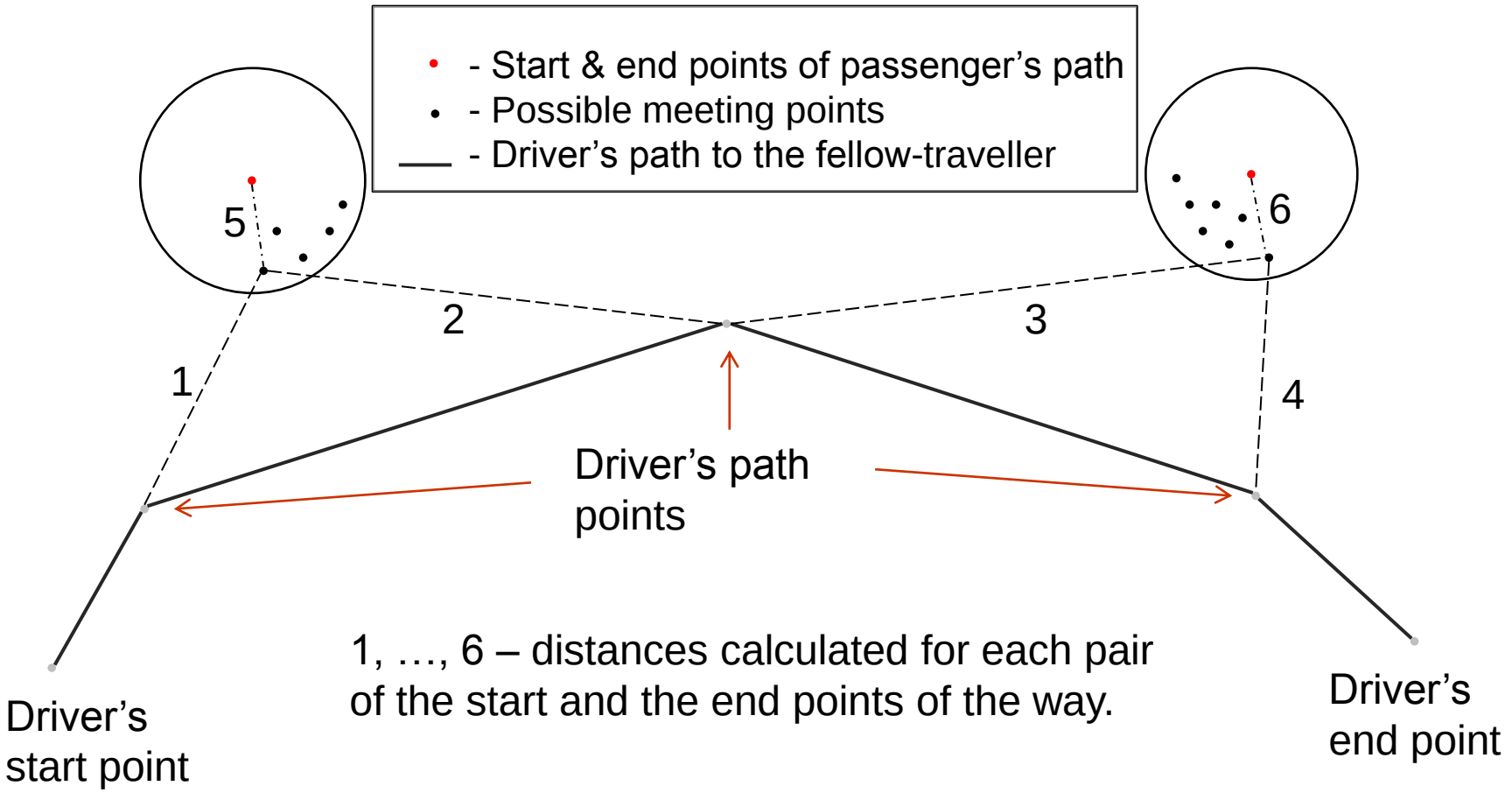
The Algorithm of Finding a Matching Path Between the Driver and the Passenger (1/2)



Which path will be better: CABD or CEFD?

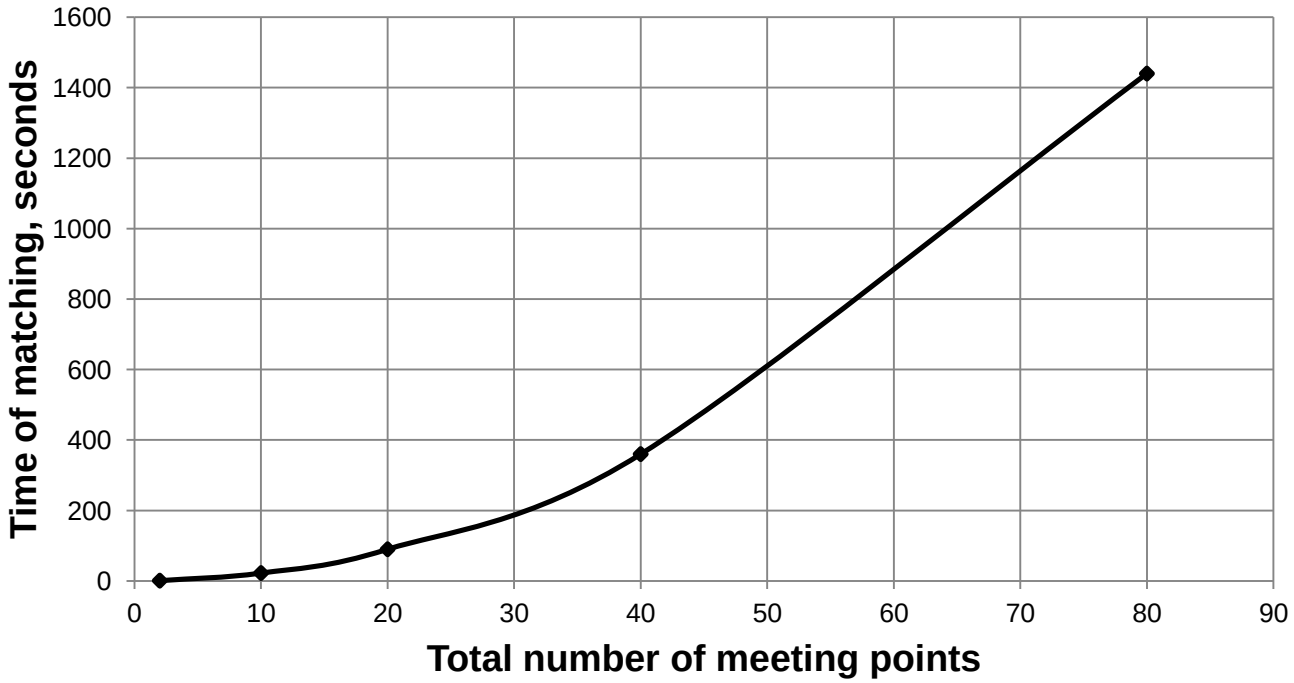
A is the start point of the pedestrian's path
B is the end point of the pedestrian's path.
C is the start point of the driver's path
D is the end point of the driver's path.
CD is the shortest driver's path, which is found with the help of GIS

The Algorithm of Finding a Matching Path Between the Driver and the Passenger (2/2)



1, …, 6 – distances calculated for each pair of the start and the end points of the way.

Complexity Estimation of the Algorithm

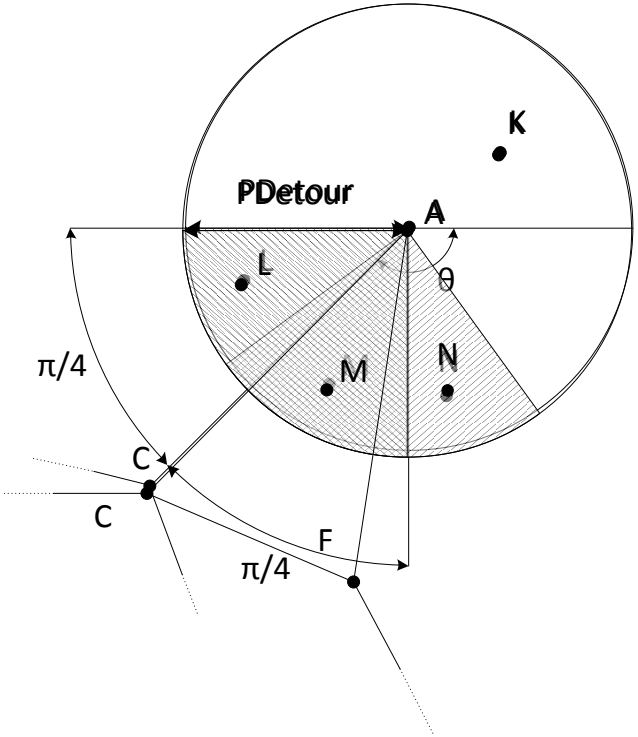


$$T_{work} = N_{MPS} * N_{MPE} * N_{counts} * t_{one\ counting}$$

Complexity depends on the amount of start meeting points - N_{MPS} and the amount of end meeting points - N_{MPE}

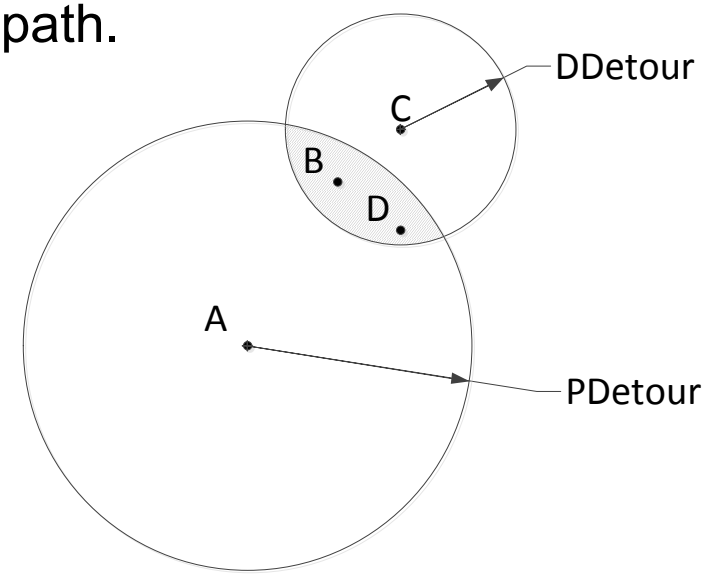
Proposed Heuristics for Reducing Algorithm Complexity

First heuristic. Selecting points of the sector from which the driver starts



$$\theta = \text{arctg}\left(\frac{C^y - A^y}{C^x - A^x}\right)$$

Second heuristic. Selecting points in the intersections of the circles around the passenger's start and end points with the circles around the points of the driver's path.

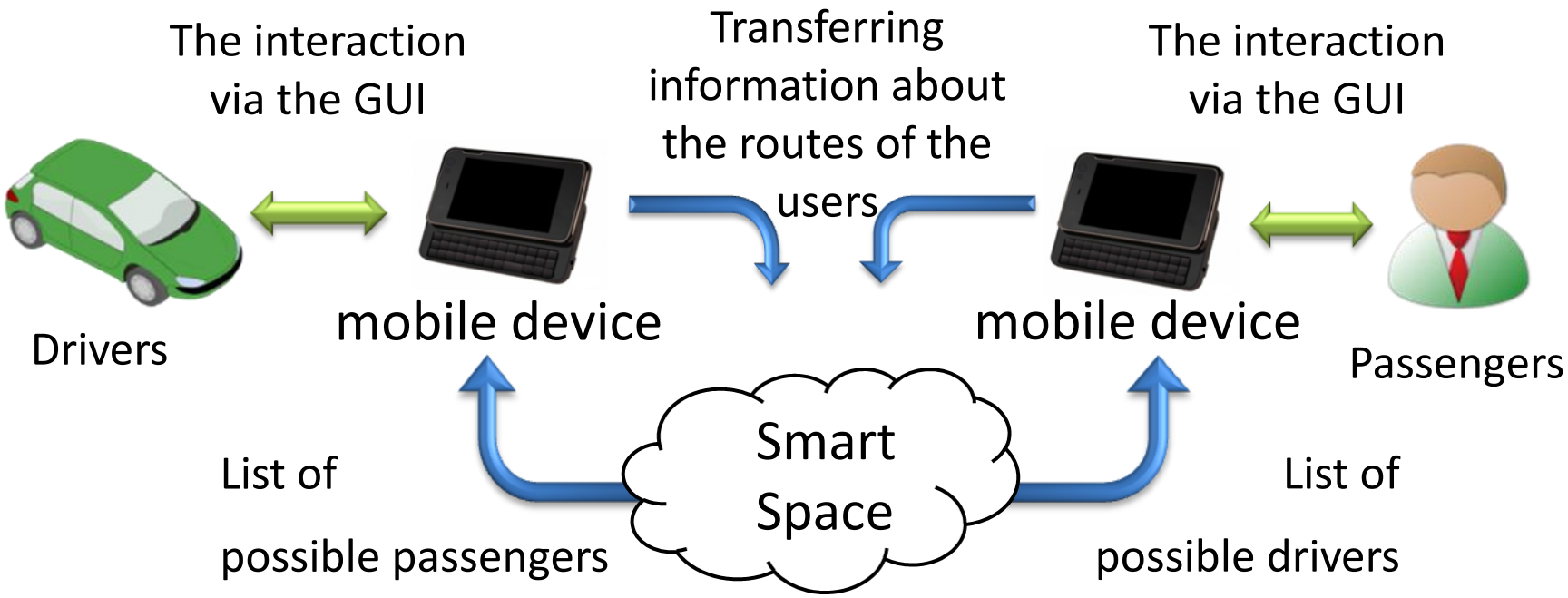


A is the point of the pedestrian's path
C,F is the point of the driver's path
B,D,K,L,M,N is the possible meeting points

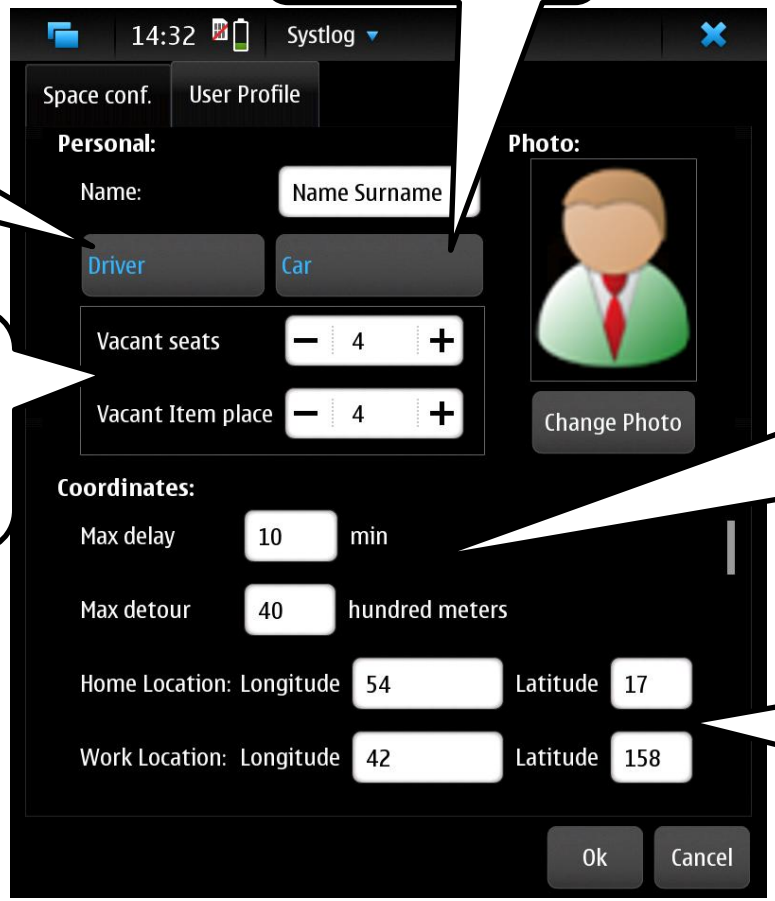
Assumptions for Using Proposed Heuristics

- A lot of drivers. Heuristics have strong limitations and filter out a lot of points. If there are no many drivers, then the use of the heuristics will rarely get positive result.
- A small value of DDetour. Heuristics will not be helpful with a large value of DDetour.
- Uniform distribution of roads on the map. The uneven distribution of roads (rivers, lakes, etc) leads to a lack of roads in some sectors, which could lead to the loss of possible meeting points due to the need to detour around the obstacles and to pick up the pedestrian on the other side.

System Working Scenario



Case Study: User Profile Configuration (1/2)



User's vehicle type

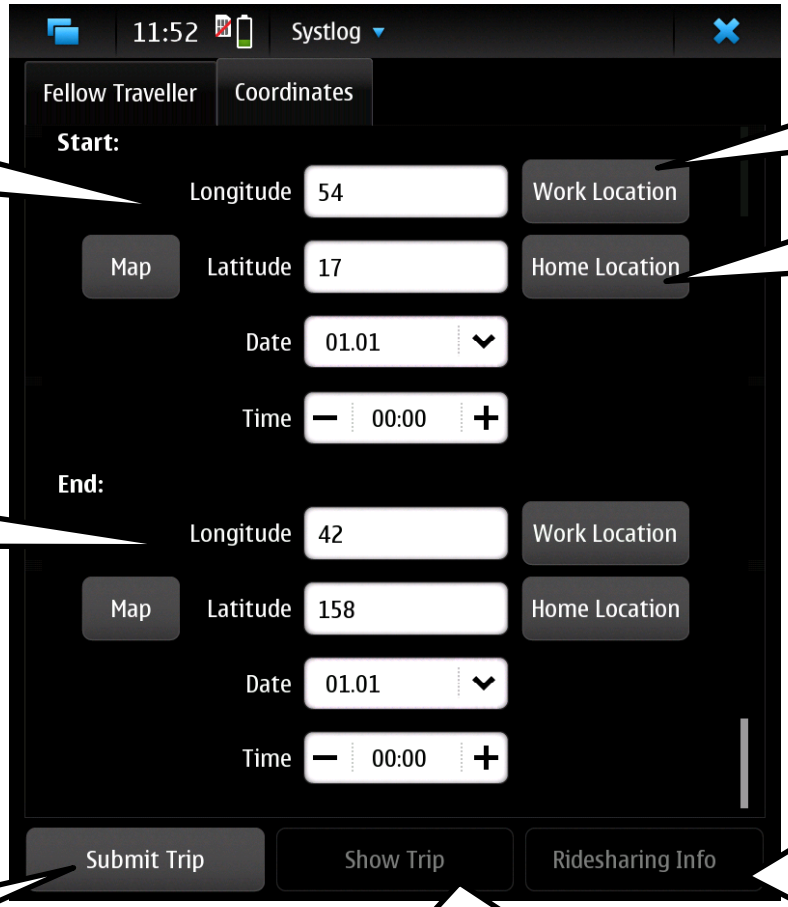
User's type in the system

How many peoples and items this user can get on board

How long user can wait for the another user and how fair he can move to the meeting point

Coordinates of user's home and work locations

Case Study: User Path Configuration



Start point properties

Set coordinates of work location as start point

Set coordinates of home location as start point

End point properties

Shows merging path and information about fellow-travellers

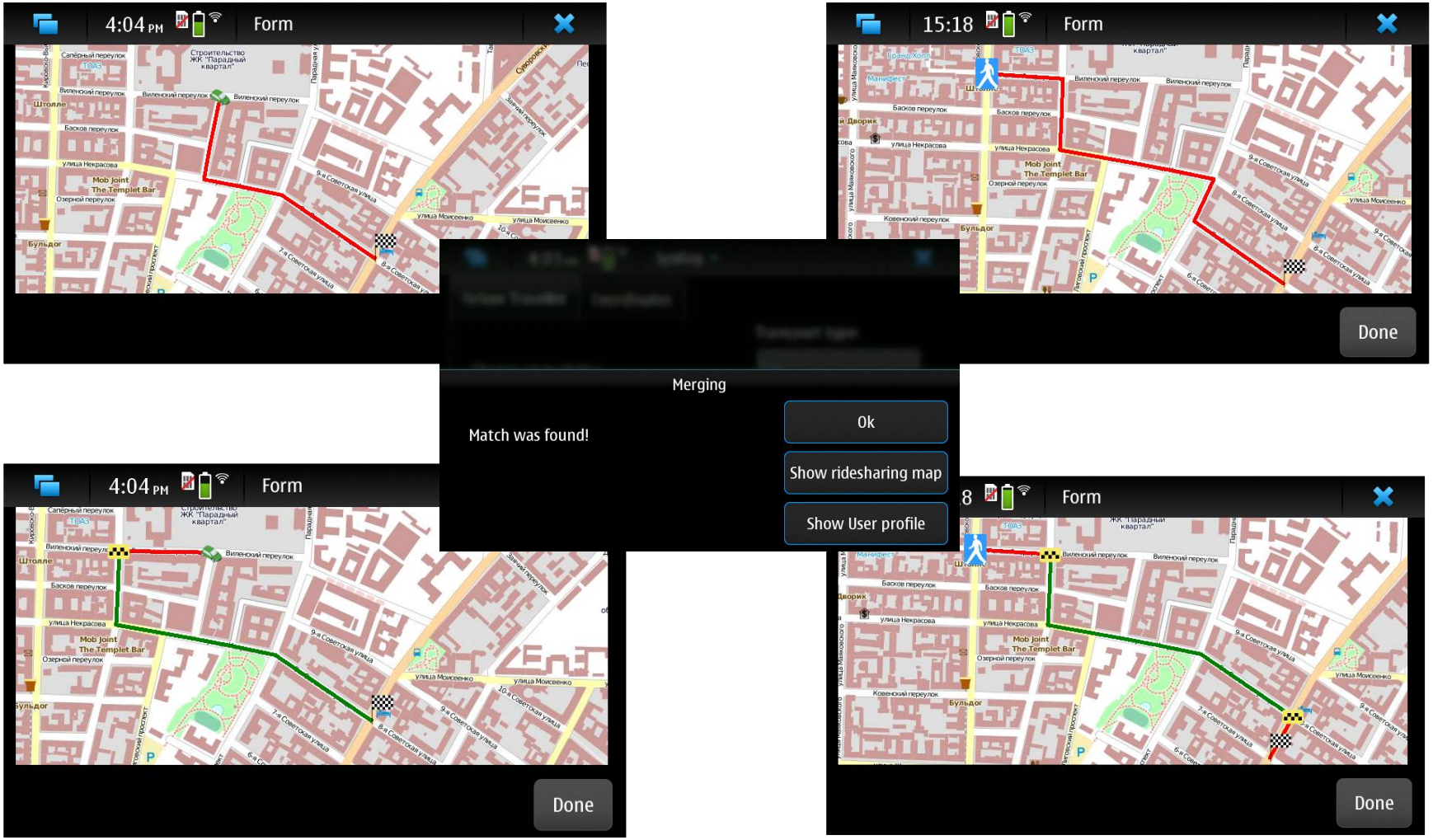
Send information to the Smart Space

Shows path of the user when he goes alone

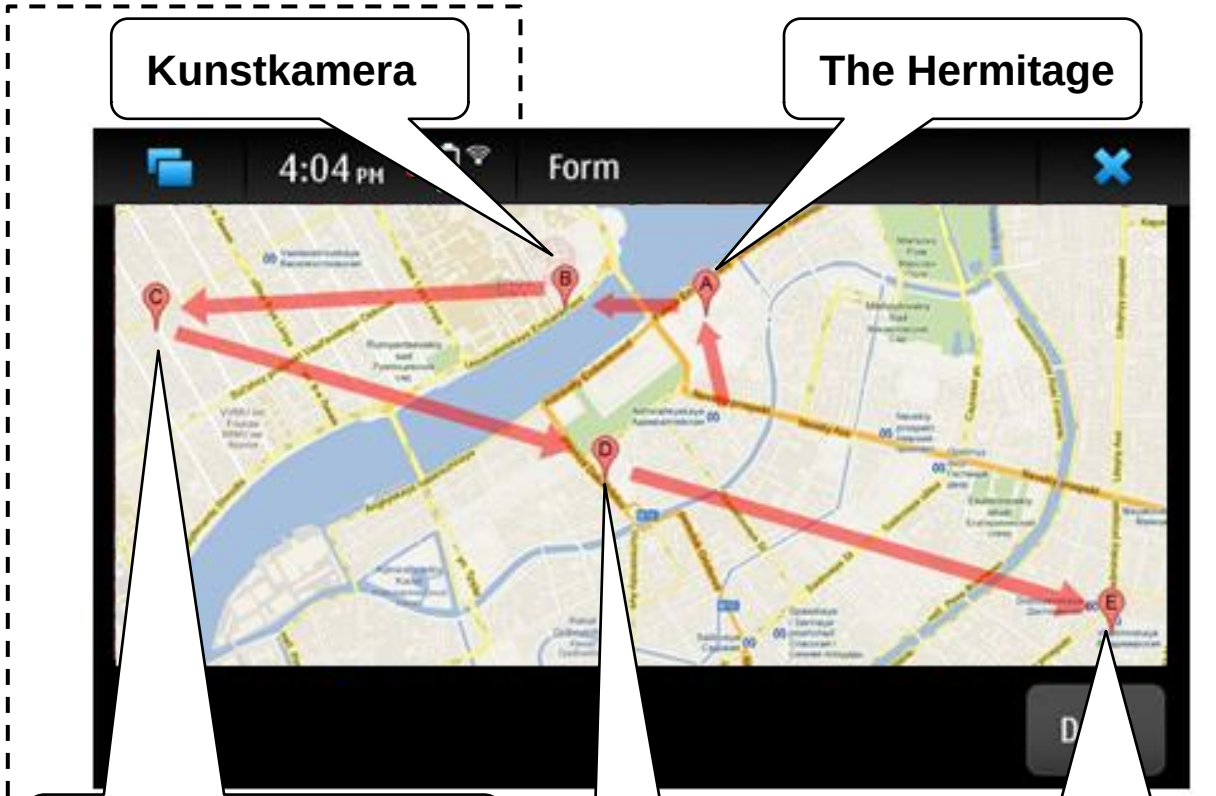
Case Study: System in Work

Driver

Passenger



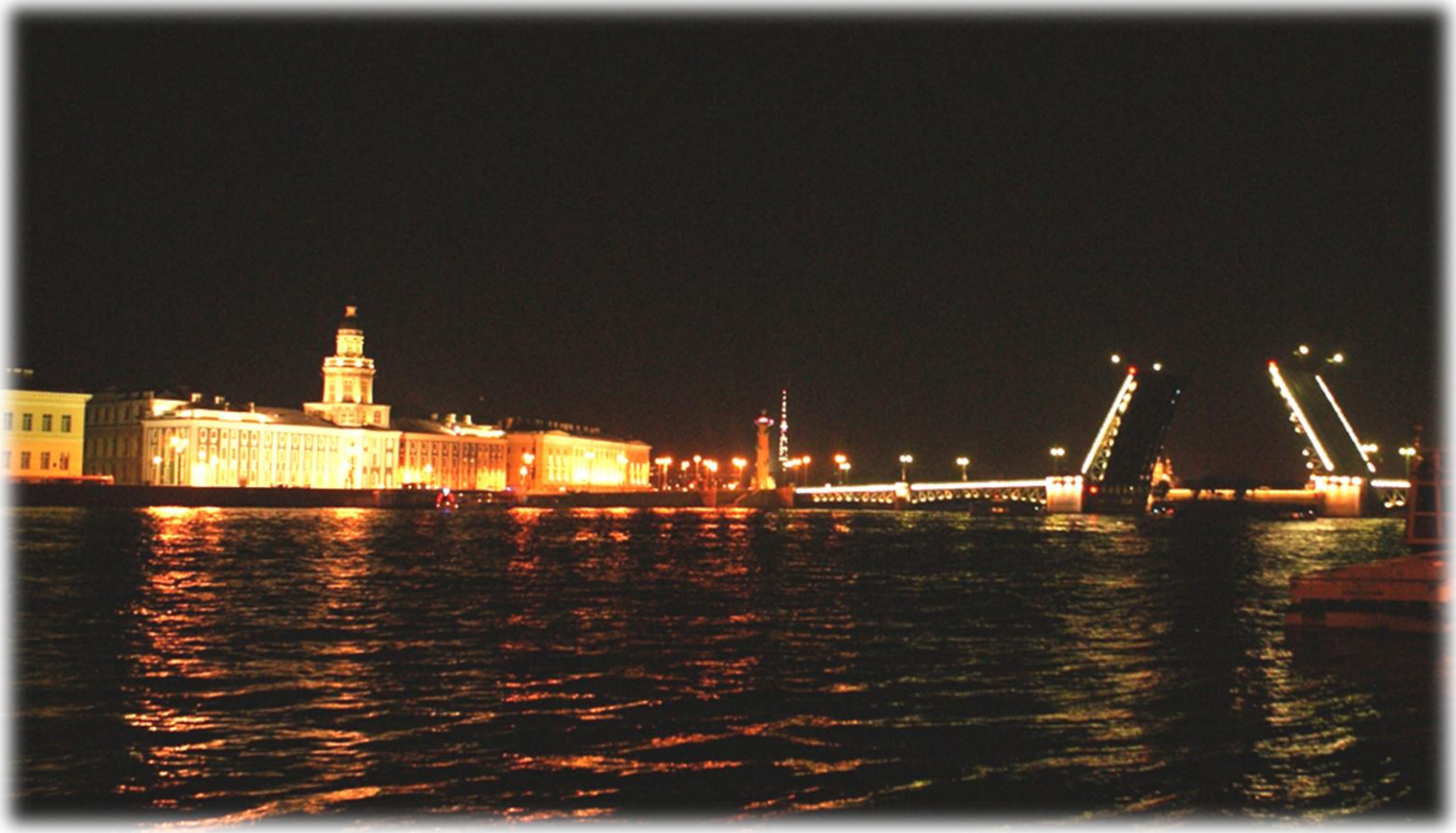
Case study. Excursion Plan Service



Conclusion

- Some major touristic problems in Karelia region have been considered.
- The architecture of the system for context-oriented tourists support in Karelia region has been proposed. The system consists of set of services which interact in smart space.
- Possible scenario for using this system has been proposed.
- Detailed description of ridesharing service has been presented.
- At the end the case study has been presented.

Thank you for Attention
Questions are Welcome



St. Petersburg, Russia, E-mail: alexey@iias.spb.su