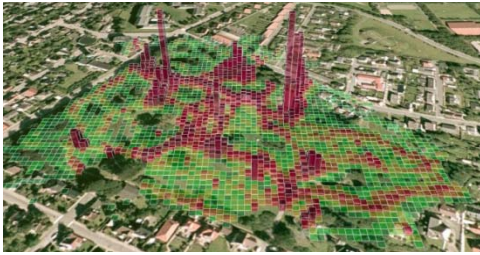


Life in Urban space - GPS/GIS based analyses of human behavior - pitfalls and possibilities the Aalborg Case - Henrik Harder, Peter Bro and Valinka Suenson, Aalborg University, 2009

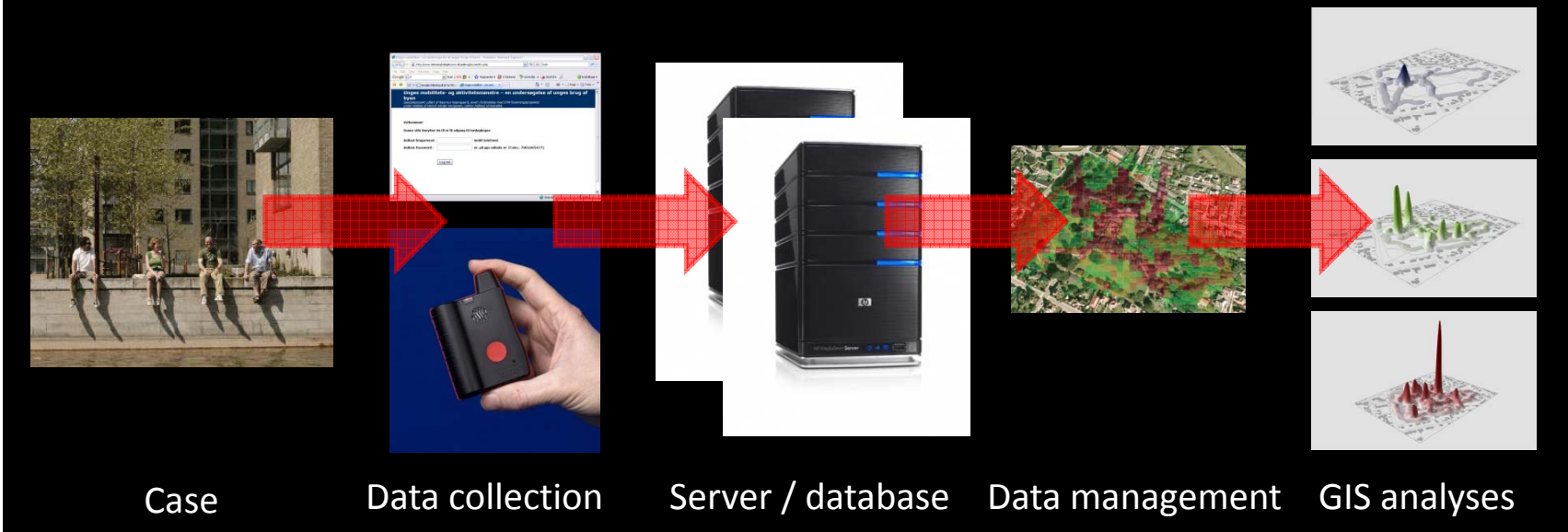
Abstract:

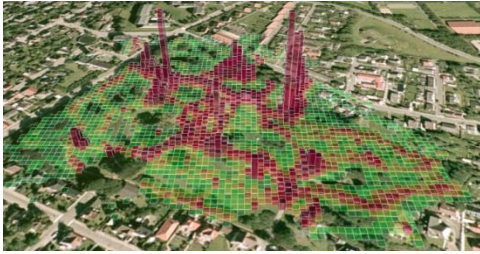
Taking a point of departure in a GPS based survey and registration of 212 (respondents) young people's behavior and activities in a 7 days period in spring and autumn 2008/2009 in Aalborg pitfalls and possibilities using GPS surveys in an urban environment is described in this paper. The paper also focus on some of the results connected to the young people's actual use of urban spaces/areas and the results from an urban attractiveness survey where 145 (respondents) of the young people from the overall survey participated. The questions in the attractiveness survey are focused on what parameters, in young people's opinion, that makes an urban space attractive / unattractive.



Use of the newest emerging technologies: GPS, RFID, mobile phone tracking etc.

In this Aalborg case we collect our empirical data using GPS units with a direct online GPRS connection to our server/database. Supplementary data is collected qua web queries every evening in seven day for each respondent. We are at the moment trying to develop alternative data collections methods based on data from mobile phones, RFID tags, video etc.





## Main research case 2008/2009: GPS tracking of 200+ respondents in Aalborg

In the Aalborg case we analyze human behavior and activities in physical and virtual environments in space and time and use a cross-disciplinary research approach in describing relations and dynamics between humans, spaces, and flows. Using our surveys it is possible to ask location based and activity based and/or time based questions in real time. Questions like:

Where are you?  
 What are you doing, for how long time?  
 Why are you doing what you do?

Det mangfoldige byrum

Tur nr. 2, den 9/4

Send en e-mail til [dus@aod.aau.dk](mailto:dus@aod.aau.dk) hvis der er problemer med GPS'en eller spørgeskemaet i dag (bemærk at GPS punkterne kan godt springe lidt)

Skriv time:  Vælg  Vælg  [Hvis du i løbet af dagen har glemt din gps eller slukket din gps, skal du udfylde spørgeskemaet alligevel.](#)

Skriv minut:  Vælg  Vælg

1. Hvornår begyndte turen?  Vælg  Vælg

2. Hvornår sluttede turen?  Vælg  Vælg  Næste dag

3. Hvilket transportmiddel benyttede du til størstedelen af turen?  Vælg

4. Hvem foretog du turen sammen med?  Vælg hvem

5. Hvad kostede denne tur for dig (Udregn hvis du har abonnement)?  Vælg

6. Hvilken aktivitet foretog du på dit bestemmelsessted?  Vælg

7. Brugte du internet på dette bestemmelsessted (angiv min. du aktivt brugte tiden)?  Vælg

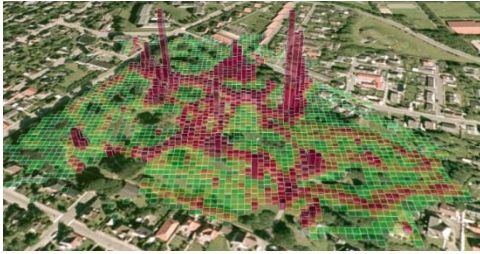
8. Hvornår besluttede du at foretage aktiviteten?  Vælg

9. Hvilken udgift var forbundet med aktiviteten (Udregn hvis du har abonnement)?  Vælg

Husk at afpasse tiden for turstart og turafslutning med kortet.

Kort Satellit Hybrid

Klik her hvis turen/aktiviteten falder udenfor ovenstående svarmuligheder (f.eks. var hjemme hele dagen)

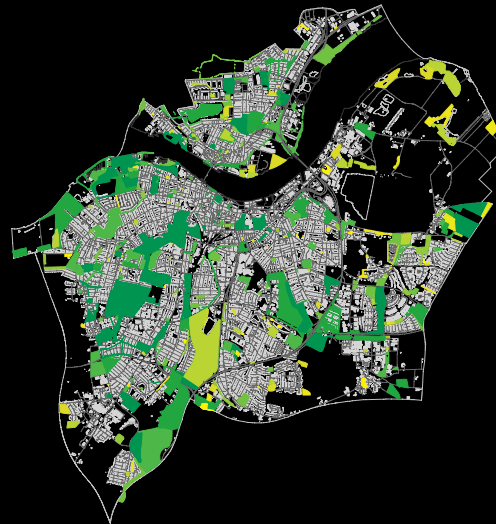


**Main research Goal: To facilitate the creation of the best urban spaces in the world**

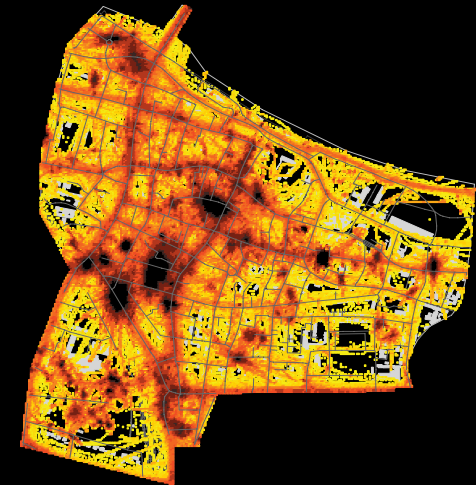
We work with analyses on three levels in the Aalborg case:



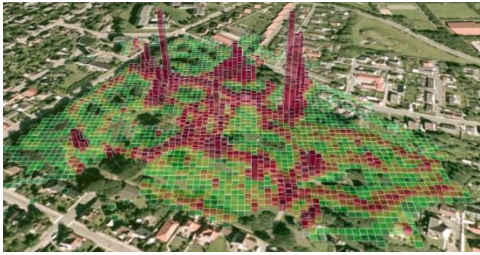
Aalborg municipality area



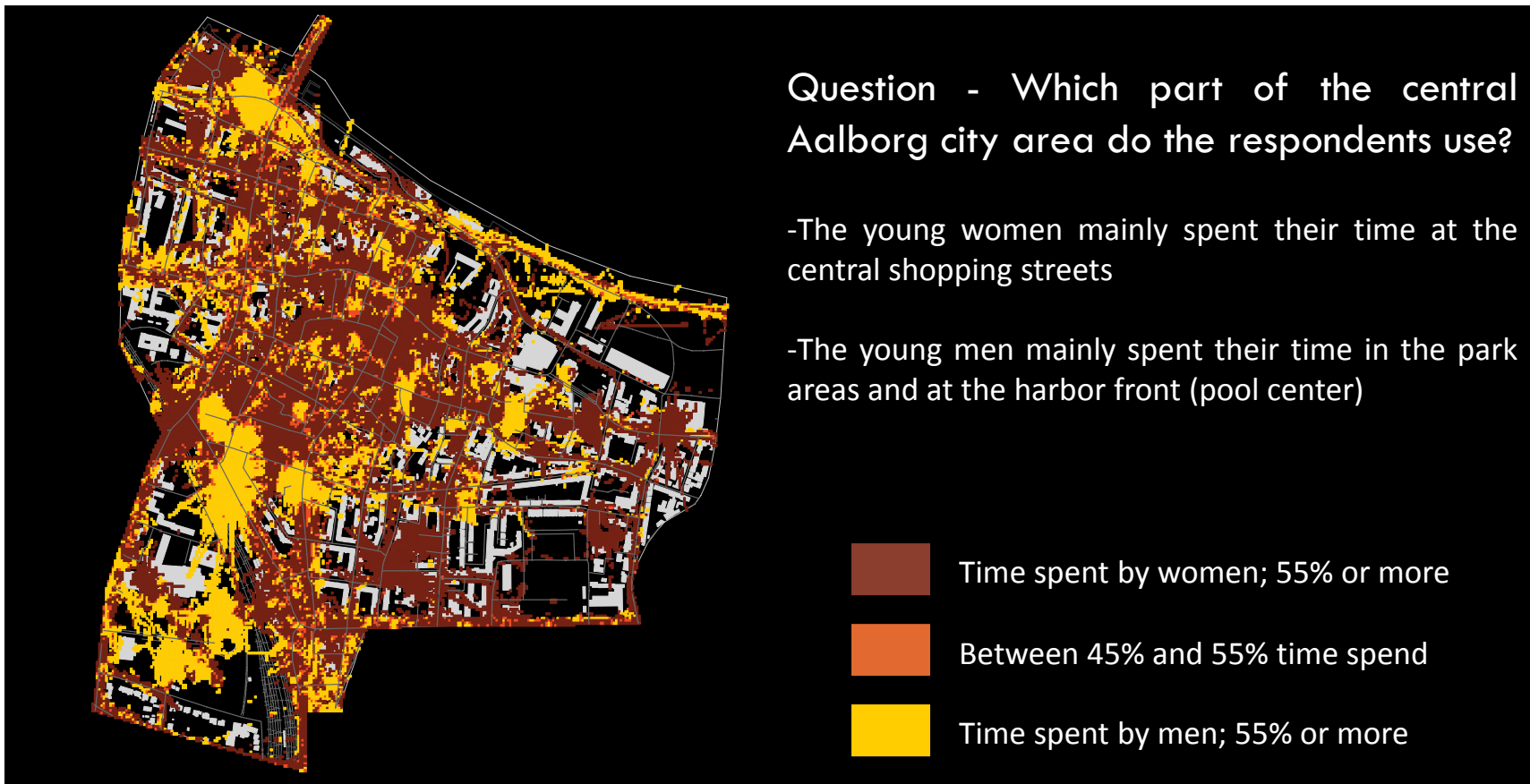
Aalborg urban area

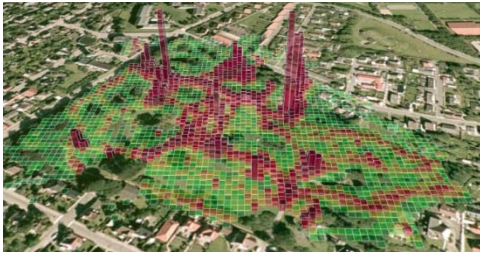


Central Aalborg city area

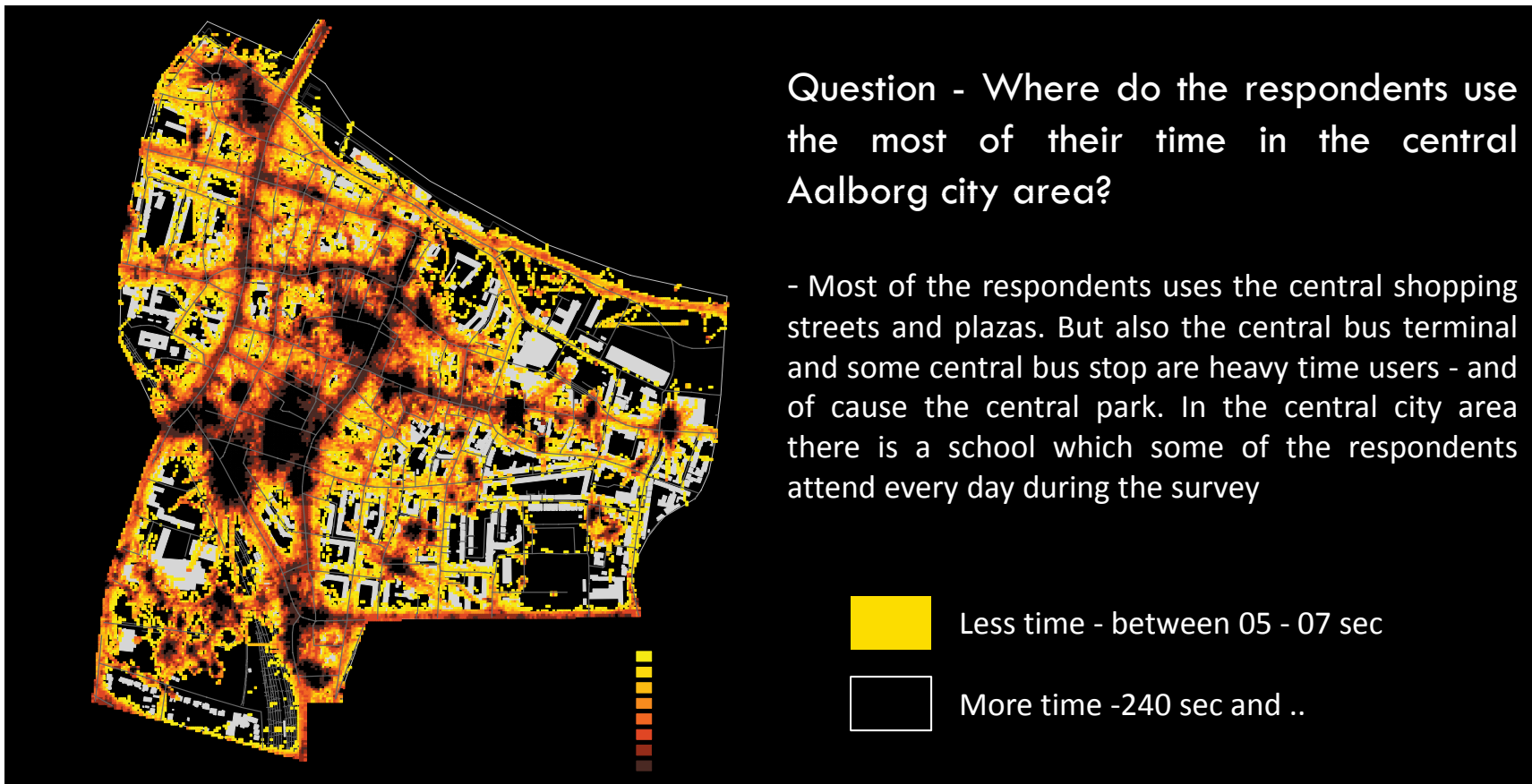


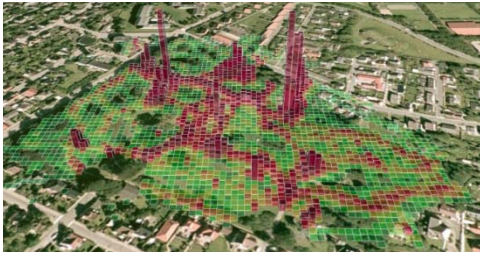
**Main research case 2008/2009: GPS tracking of 200+ respondents in Aalborg**



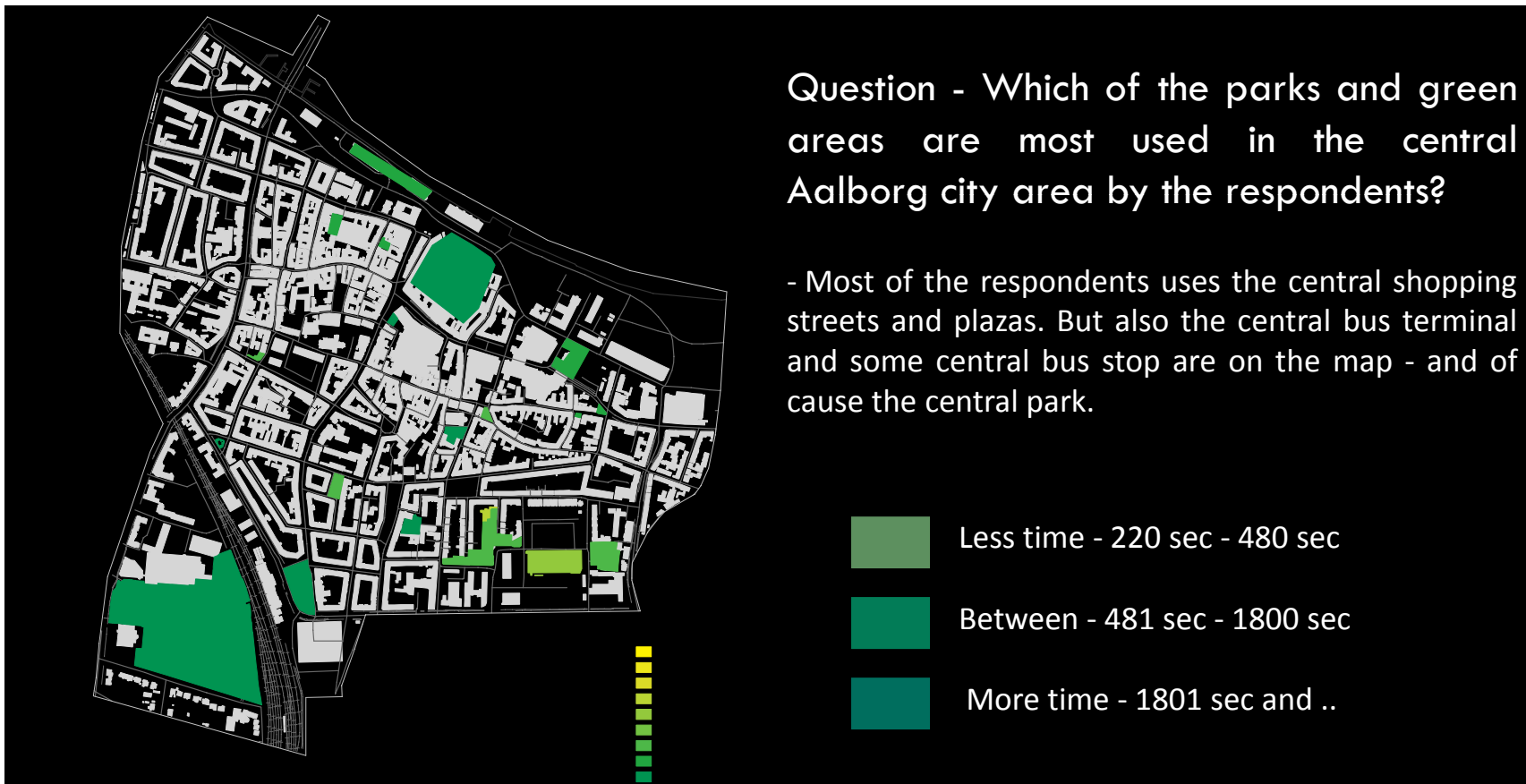


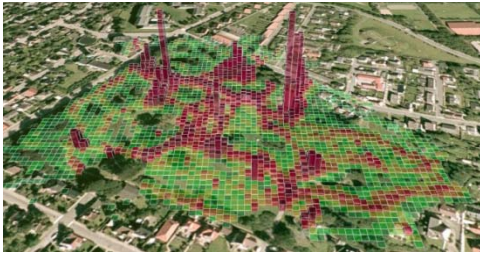
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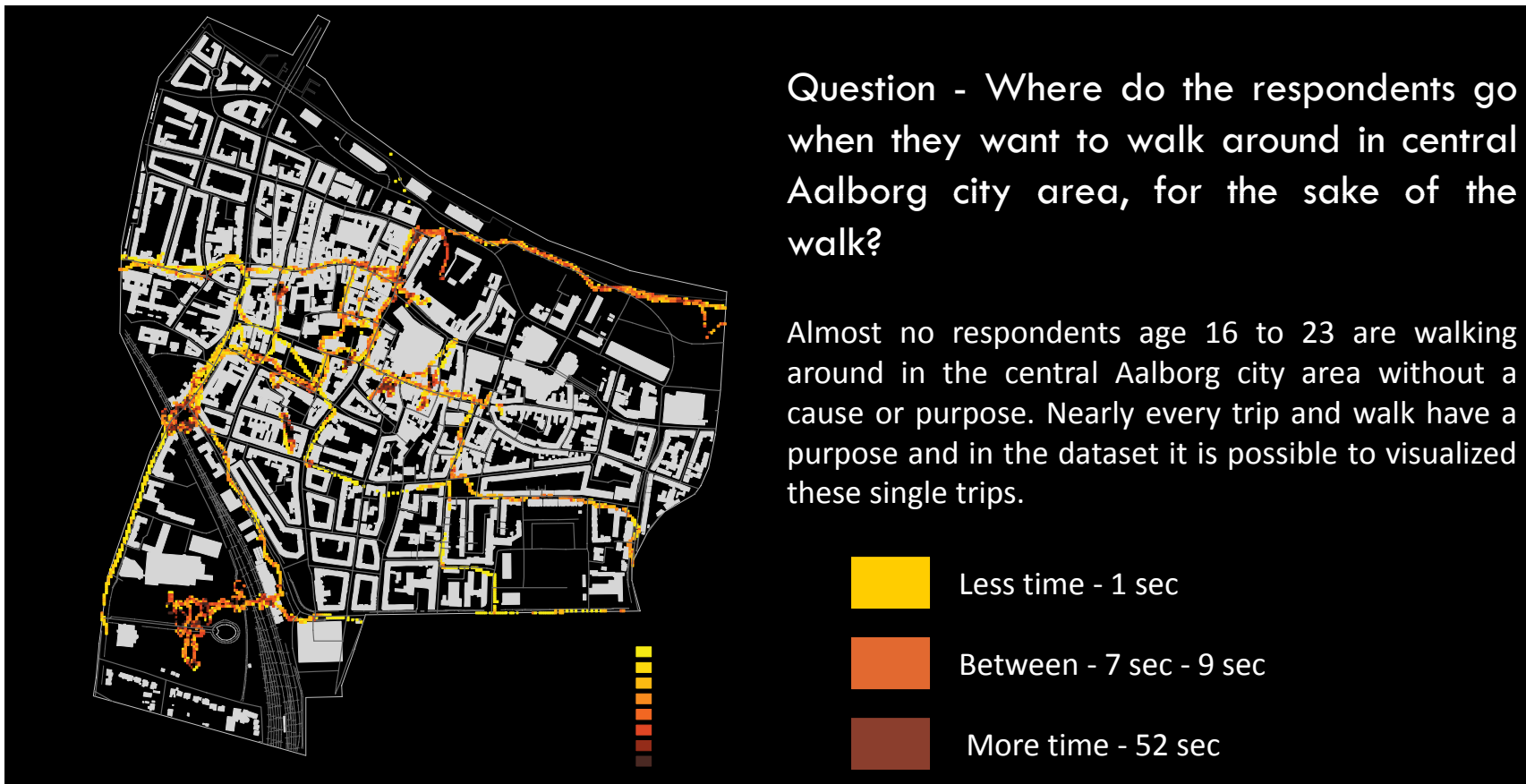


**Main research case 2008/2009: GPS tracking of 200+ respondents in Aalborg**

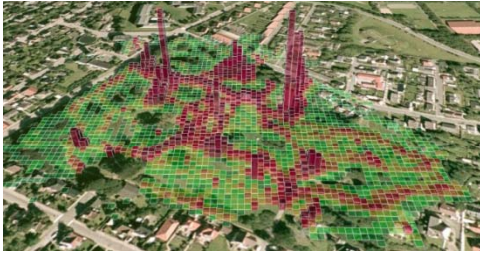




**Main research case 2008/2009: GPS tracking of 200+ respondents in Aalborg**





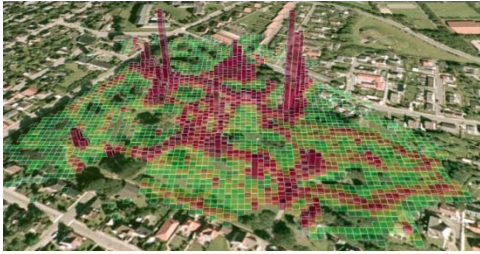


**Main research Goal: To facilitated the creation of the best urban spaces in the world**

**Main results:**

- On average the 212 respondents used about 18 minute every day in the central Aalborg City area
- On average the 212 respondents used about 9 minutes every day in parks an other green areas in the Aalborg municipality area
- On average the 212 respondents used about 47 minutes every day on the internet





**Main research Goal: To facilitated the creation of the best urban spaces in the world**

During the research we asked the respondents qua several different types of question about what makes urban spaces attractive/unattractive. Underneath is listed the results from one set of questions – which correspond quite well to answers we got qua some of the other questions about the same issues.

The four most important factors which makes

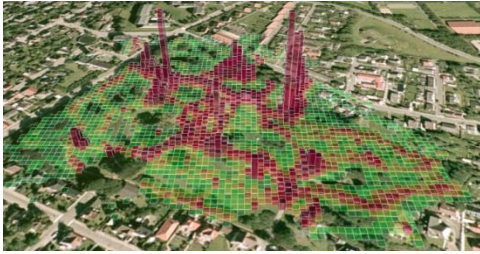
**attractive urban spaces:**

- 1.Meetingplaces
2. Trees / plants
3. The possibility to buy refreshments
4. Shopping possibilities

The four most important factors which makes

**unattractive urban spaces:**

1. Missing cleaning, dirty areas
2. The traffic
3. Missing maintenance / decay
4. Criminality

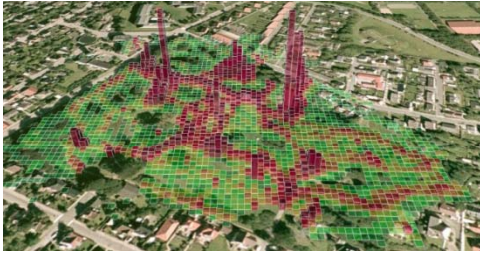


## Main research case 2008/2009: GPS tracking of 200+ respondents in Aalborg

**The respondents:** Notice the underrepresentation of men, underrepresentation of 20 to 23 year olds and overrepresentation of respondents attending high school-educations in the upper secondary educations system and in the respondent sample published in this paper.

*“The GPS-based activity survey and the concomitant web survey are based on 212 young people from the gross population of about 7.277 young people attending upper secondary educations system in Aalborg municipality (2006 Danmarks statistik) corresponding to about 3% of all young people attending upper secondary education in Aalborg municipality, or about 1% of the 20.645 young people between the ages 16-23 in Aalborg municipality (2006 Danmarks statistik).”*

*“The respondent group is divided between the following places of study: Hasseris Gymnasium 38 (18%), Nørresundby Gymnasium 28 (13%), Aalborg Handelsskole 31 (15%), Aalborg katedralskole 45 (21%), Aalborg Studenterkursus 19 (9%), Aalborg Tekniske Skole og Tekniske Gymnasium 51 (24%). The respondent group has the following gender distribution: Women 121 (57%), and men 91 (43%). The respondent group has the following age distribution: 16 years 44 (21%), 17 years 72 (34%), 18 years 48 (23%), 19 years 29 (14%), 20 years 8 (4%), 21 years 2 (1%), 22 years 4 (2%), 23 years 5 (2%).”*



## Data validity:

Do they carry their GPS for the whole day? *Yes*, in average this is not a problem

*Mængde tid 06:00-08:00: 54 days 19 hours 48 minutes 0 seconds*

*Mængde tid 08:00-10:00: 57 days 12 hours 5 minutes 3 seconds*

*Mængde tid 10:00-12:00: 50 days 9 hours 15 minutes 41 seconds*

*Mængde tid 12:00-14:00: 48 days 15 hours 30 minutes 49 seconds*

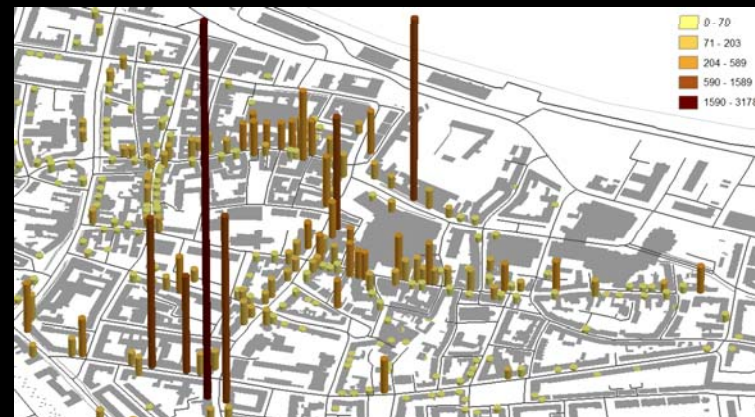
*Mængde tid 14:00-16:00: 55 days 0 hours 54 minutes 49 seconds*

*Mængde tid 16:00-18:00: 60 days 8 hours 37 minutes 39 seconds*

*Mængde tid 18:00-20:00: 57 days 11 hours 55 minutes 25 seconds*

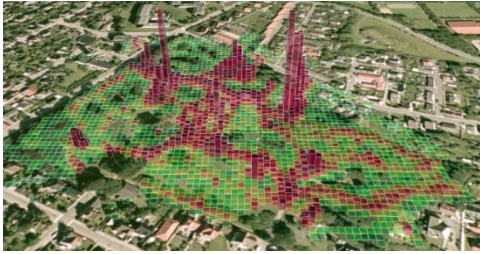
*Mængde tid 20:00-22:00: 59 days 19 hours 52 minutes 34 seconds*

*Mængde tid 22:00-24:00: 59 days 20 hours 57 minutes 30 seconds*



Do people have the GPS turned on during all 7 days? *No*, they turn it of in night time

*“As a foundation for the map segments shown in this report GPS points corresponding to a collected time of 666 days 6 hours 13 minutes and 13 seconds registered or about 45% of the possible time of a total of 1.484 days for the 212 respondents. A large amount of respondents have had their GPS turned off at night, when they have been staying at their home address, and if it is calculated that all GPS’s have been turned off at least 8 hours every 24 hours, it means that actually 70% of the collected time in the remaining 16 hours have been registered.”*



## Acknowledgements

The authors wish to thank Realdania for the financial support and Nicolas Rendtlew Horst, Anders Knørr Lyseen, Anders Sorgenfri Jensen and Henrik Skov from Aalborg University for their invaluable contribution by leading and conducting the work with the GIS analyses and Thomas Sick Nielsen for his comments and .... without the help from Anders Kvist Simonsen and Nerius Tradisauskas databases this work would not be possible ☺

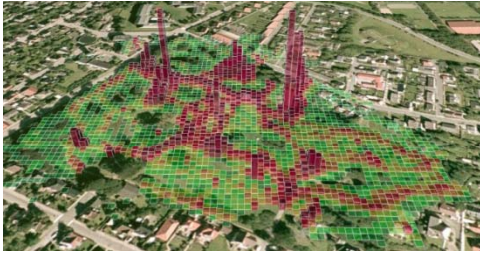
The authors also wish to thank Bodil Henningsen from the department of Planning and the Built Environment and Pernille Nymann Jensen, from the department for Park & Nature, the municipality of Aalborg, for their willingness to cooperate with the authors about the surveys and the GIS visualizations during and after the Aalborg GPS-Case surveys were conducted.

Henrik Harder, Aalborg University

Peter Bro, Aalborg University

Valinka Suenson, Aalborg University





## References:

Harder, Henrik ; Bro, Peter ; Tradisauskas, N. ; Henriksen, S. ; Hamann, R. C. ; Sommer, J.. / Det mangfoldige byrum : aalborg 2008 - byrumsundersøgelse\_del 2. Aalborg : Aalborg Universitet, 2008. 150 p. (Skriftserie for A & D).

Harder, Henrik ; Nielsen, Thomas Alexander Sick ; Bro, Peter ; Tradisauskas, Nerius. / Experiences from GPS tracking of visitors in Public Parks in Denmark based on GPS technologies. In: Urbanism on Track : Application of Tracking Technologies in Urbanism. / ed. J. van Schaick ; S.C. van der Spek. Amsterdam : IOS Press, 2008. p. 65-78 (Research in Urbanism Series).

Nielsen, Thomas Alexander Sick ; Hovgesen, Henrik Harder. / Urban fields in the making : new evidence form a Danish context. In: Tijdschrift voor Economische en Sociale Geografie. 2005 ; Vol. 96, No. 5, p. 515-528

Nielsen, Thomas Alexander Sick ; Hovgesen, Henrik Harder. / GPS in Travel and Activity Surveys. In: Trafikdays på Aalborg Universitet. Aalborg Universitet, 2004. 13 p. (Trafikdays på Aalborg Universitet [Online]).