Crime maps as examples of service-oriented maps

SOMAP 2012

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- Introduction

- Categories of crime maps

    - Strategic

    - Operational

    - Tactical

    - Forensic

- Conclusion

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Crime mapping - Overview

- Dates back to 1833 when Andre-Michael Guerry used crime and census data to establish relationships
- USA in the 1900's started using pin maps to show distribution of crimes
- South Africa Police Service used for decades pin maps to show distribution of crimes as well as mapping serial killer dump sites.
- CSIR's involvement started in 1997 as part of an Innovation Fund project to illustrate the use of computerised crime mapping using GIS

Four categories of crime mapping

- Strategic
- Operational
- Tactical
- Forensic

Staatsoper
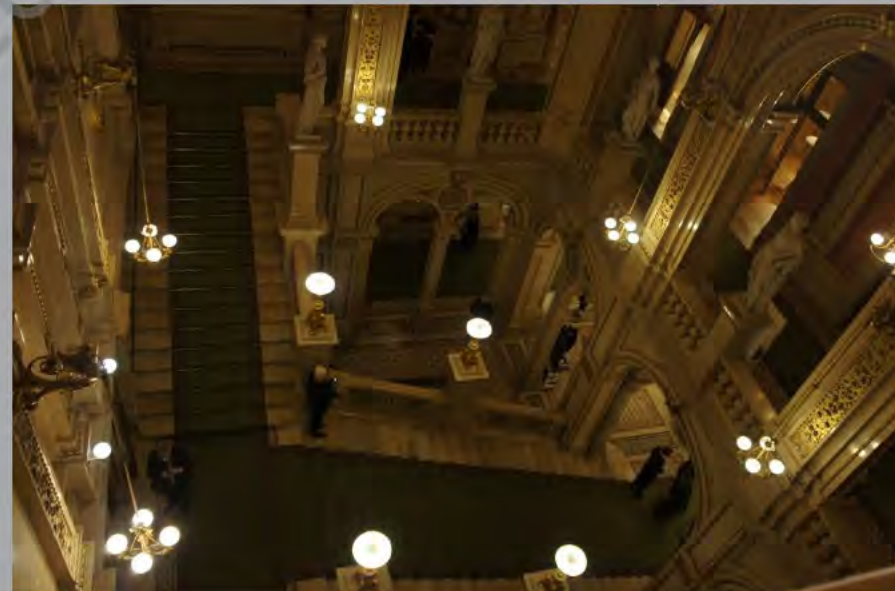
- Looks at trends over a long period to determine crime patterns in order to allocate resources.
- The example is the use of six crime categories to determine the resources required at Magisterial District Courts to deal effectively the crime case loads.
- A demand-and–supply model was used.
- Demand: Criminal case load
- Supply: The resources of the Magisterial District Court
- Unit measure used was time spent on a criminal case.
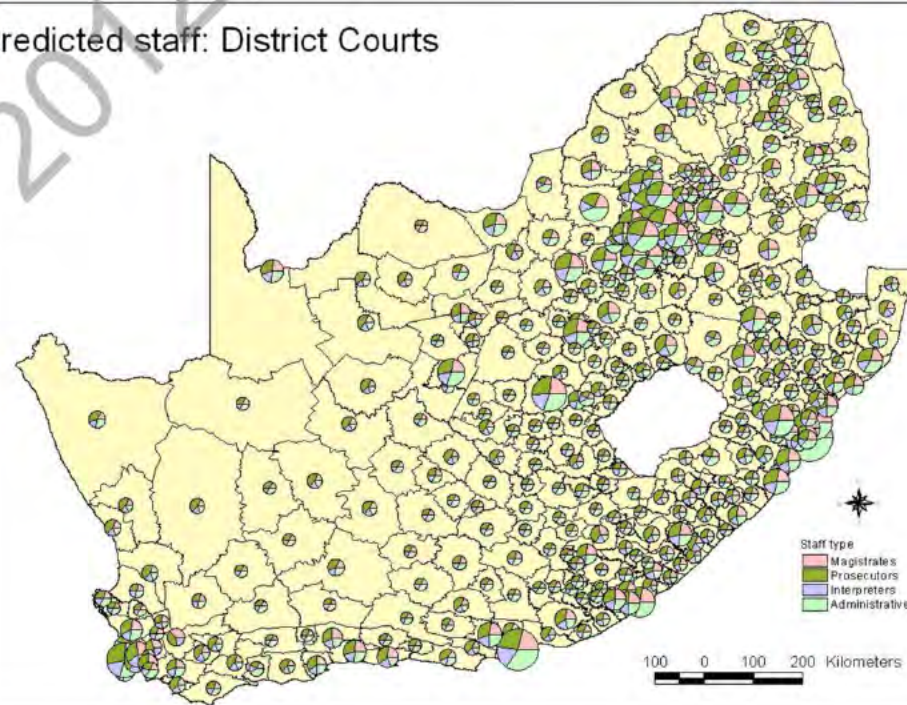
Gap analysis: Time spent on criminal cases

Gap in percent
- < -30 %
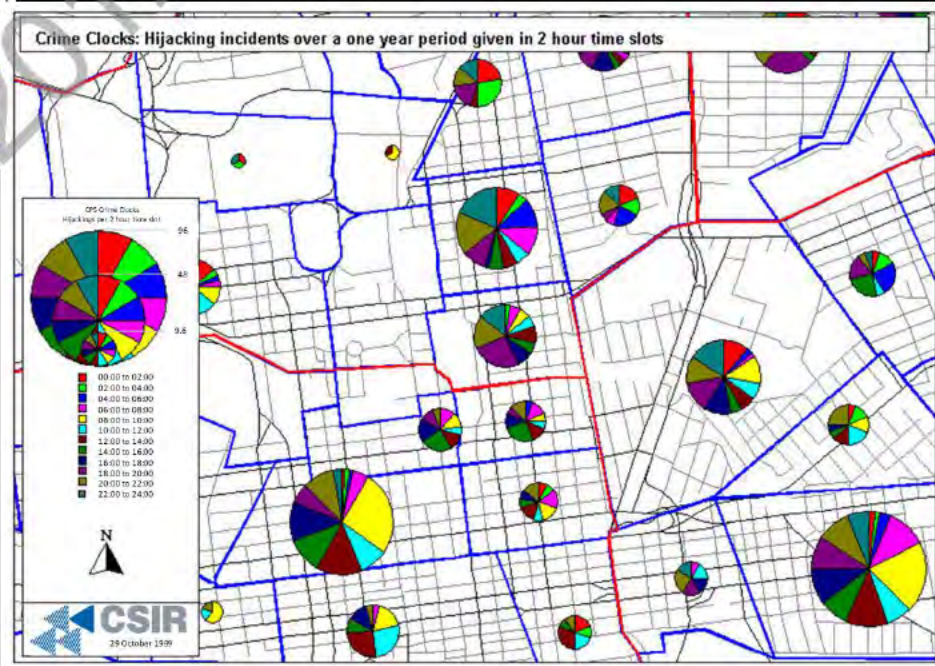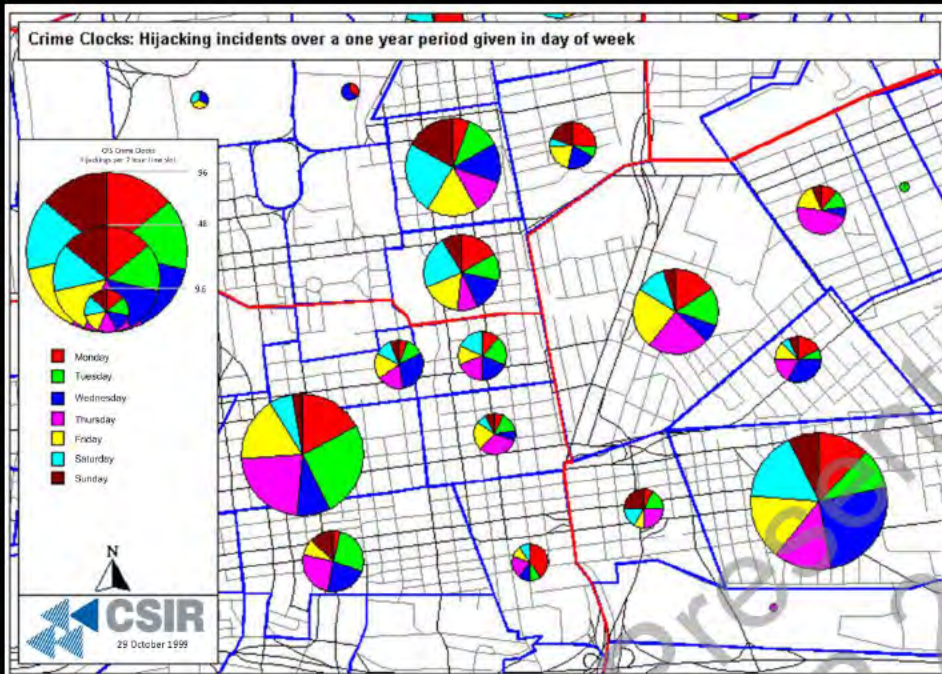- -30 % - -5 %
- -5 % - 5 %
- 5 % - 30 %
- > 30 %
- No data
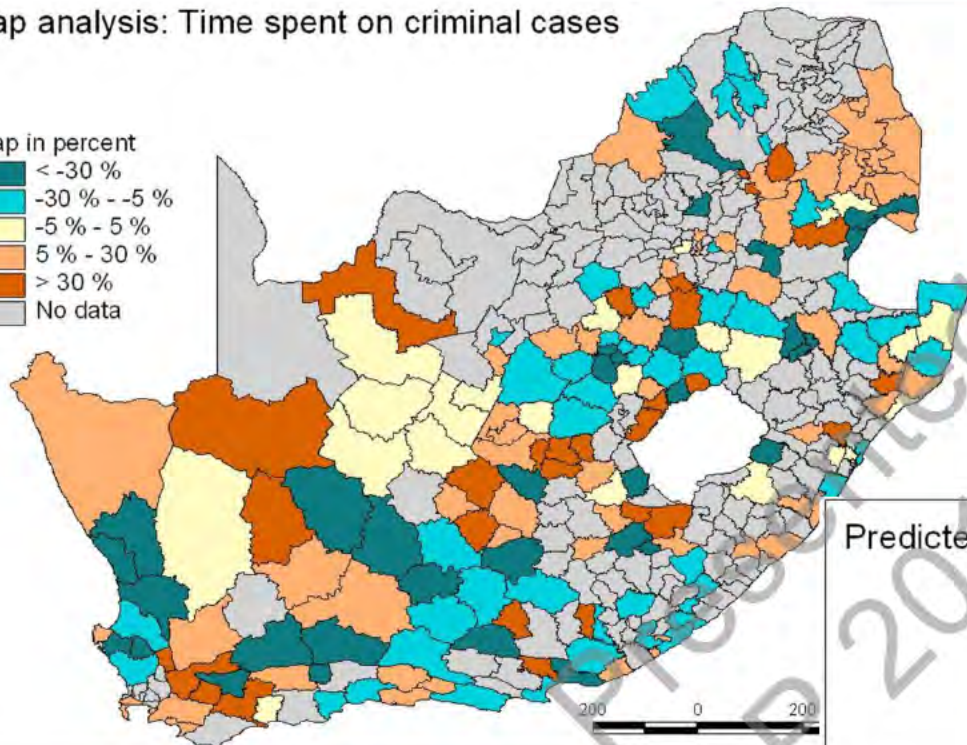
Predicted staff: District Courts

Staff type
- Magistrates
- Prosecutors
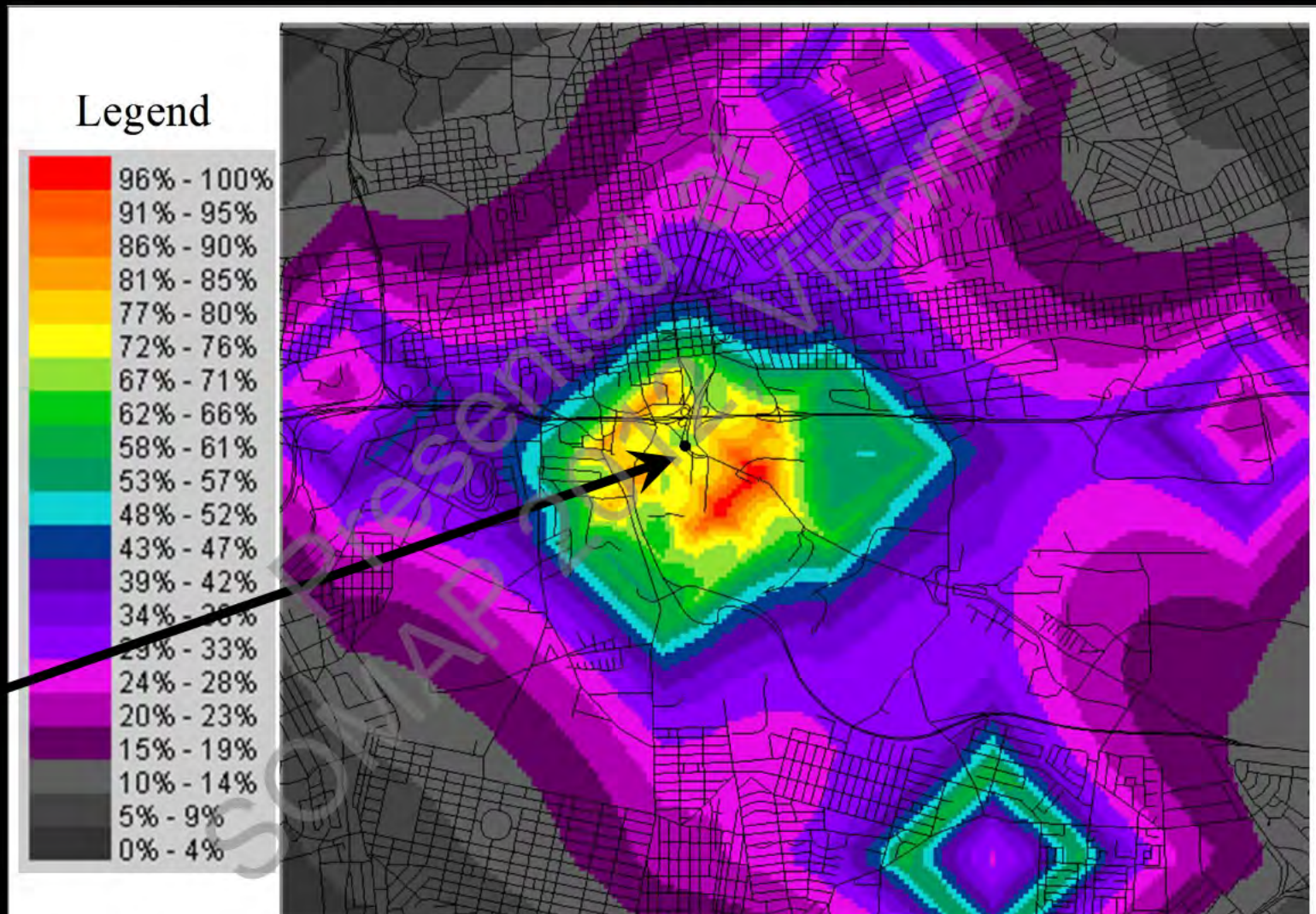- Interpreters
- Administrative

Operational

- Looks at trends over a medium term to determine crime patterns in order to do effective policing.
- The first example looks at day-of-week and time-of-day in order to deploy police officers with increased possibility to arrest perpetrators..
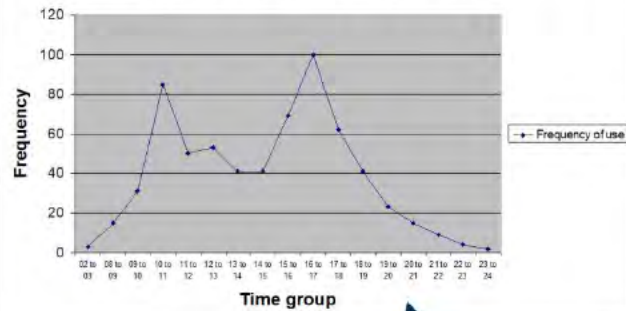- The second example looks at the effectiveness of such an operation.

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Crime Clocks: Hijacking incidents over a one year period given in day of week

Crime Clocks: Hijacking incidents over a one year period given in 2 hour time slots

Mine dump serial killer

Suspect 1: Eight most used base stations and their cells
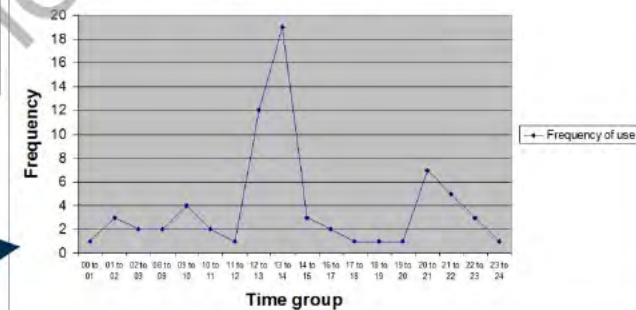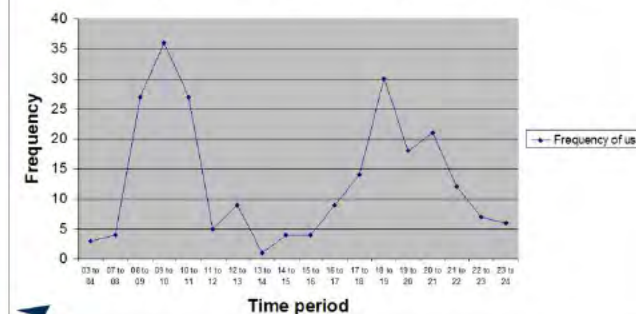
Frequency of use of Katz Building base station

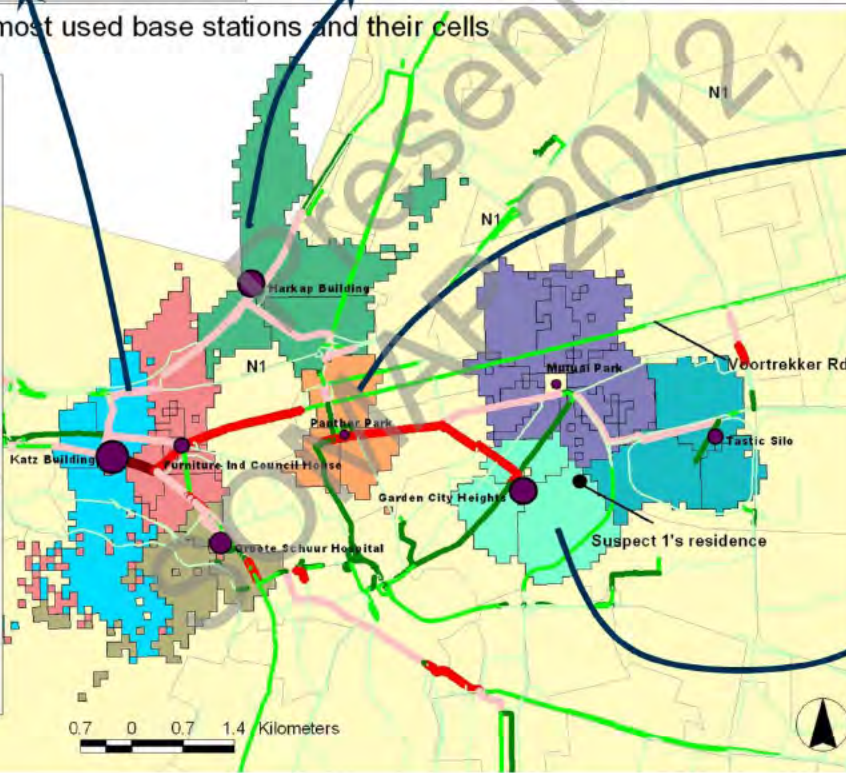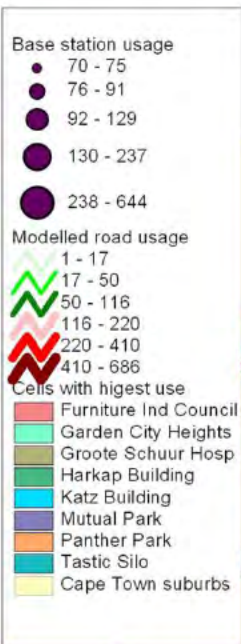Frequency of use of Harkap Building base tower
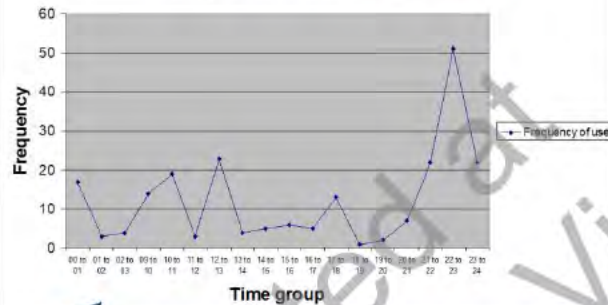
Frequency of use of Panther Park base station

Frequency of use of Garden City Heights base station

Base station usage
- 70 - 75
- 76 - 91
- 92 - 129
- 130 - 237
- 238 - 644

Modelled road usage
- 1 - 17
- 17 - 50
- 50 - 116
- 116 - 220
- 220 - 410
- 410 - 686

Cells with higest use
- Furniture Ind Council
- Garden City Heights
- Groote Schuur Hosp
- Harkap Building
- Katz Building
- Mutual Park
- Panther Park
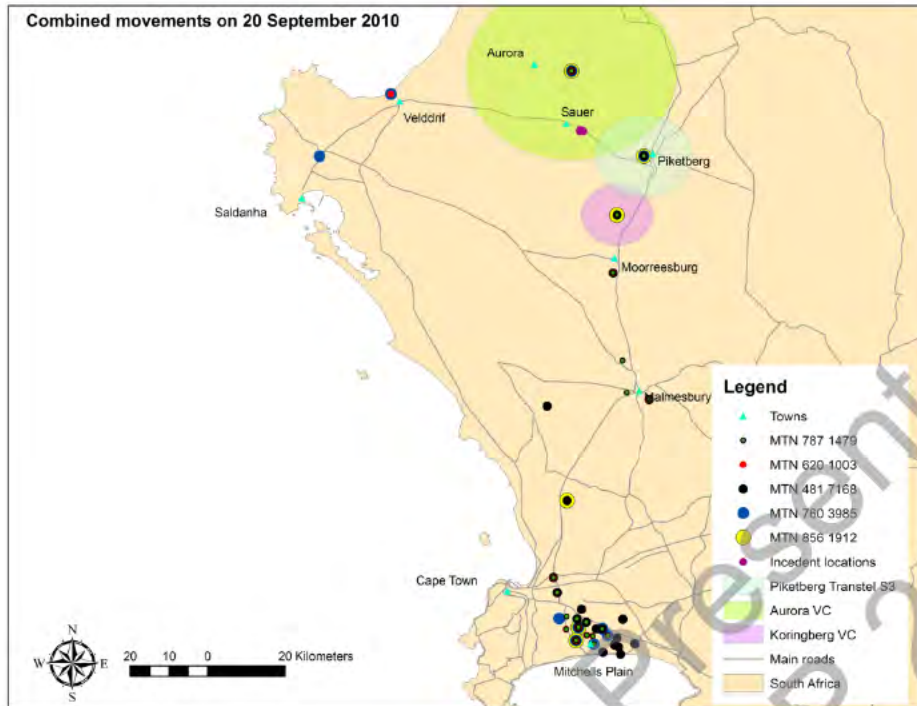- Tastic Silo
- Cape Town suburbs

Locations of cellular telephone cells and base stations, incidents, places of interest and calls made on 5 January 1998
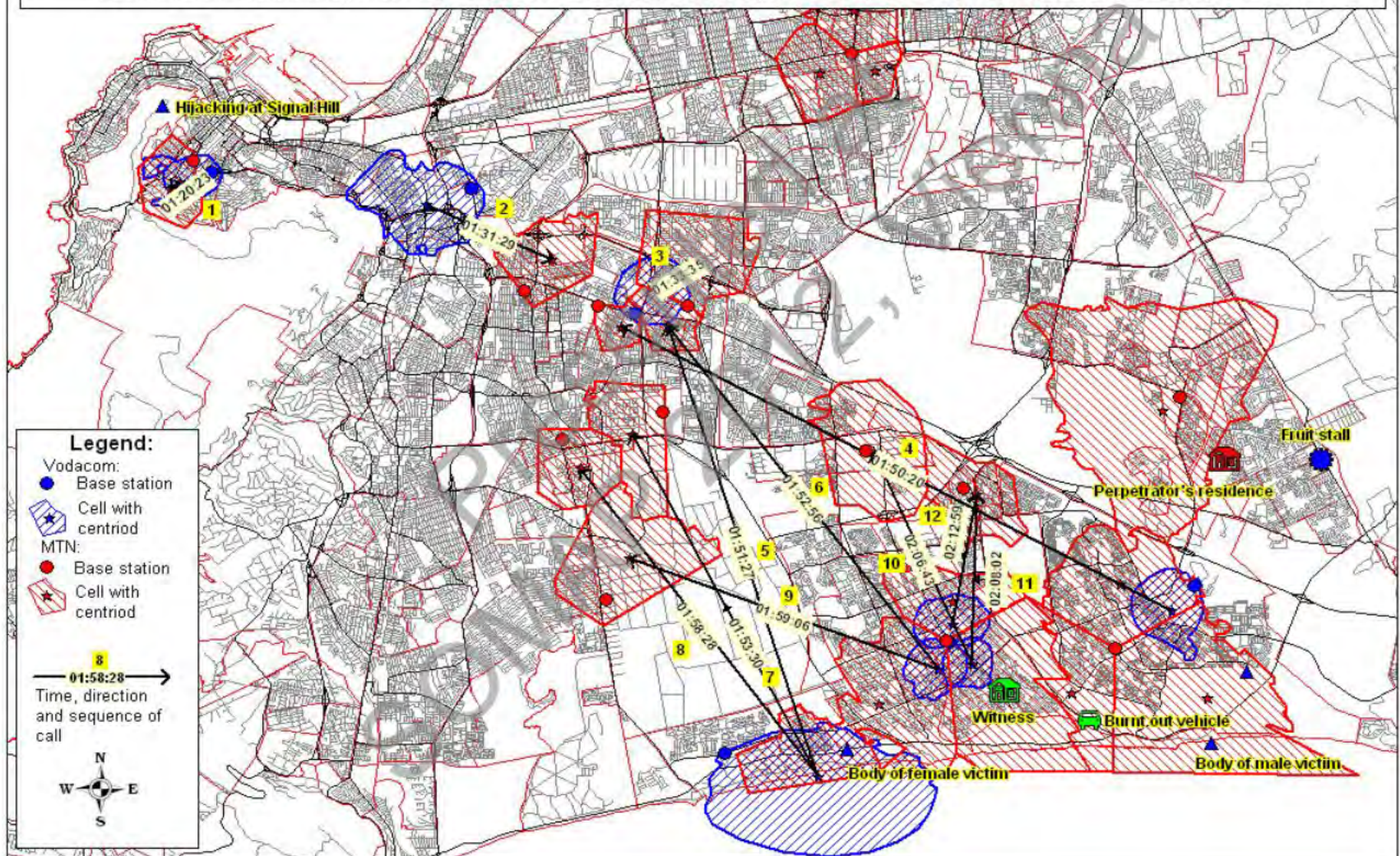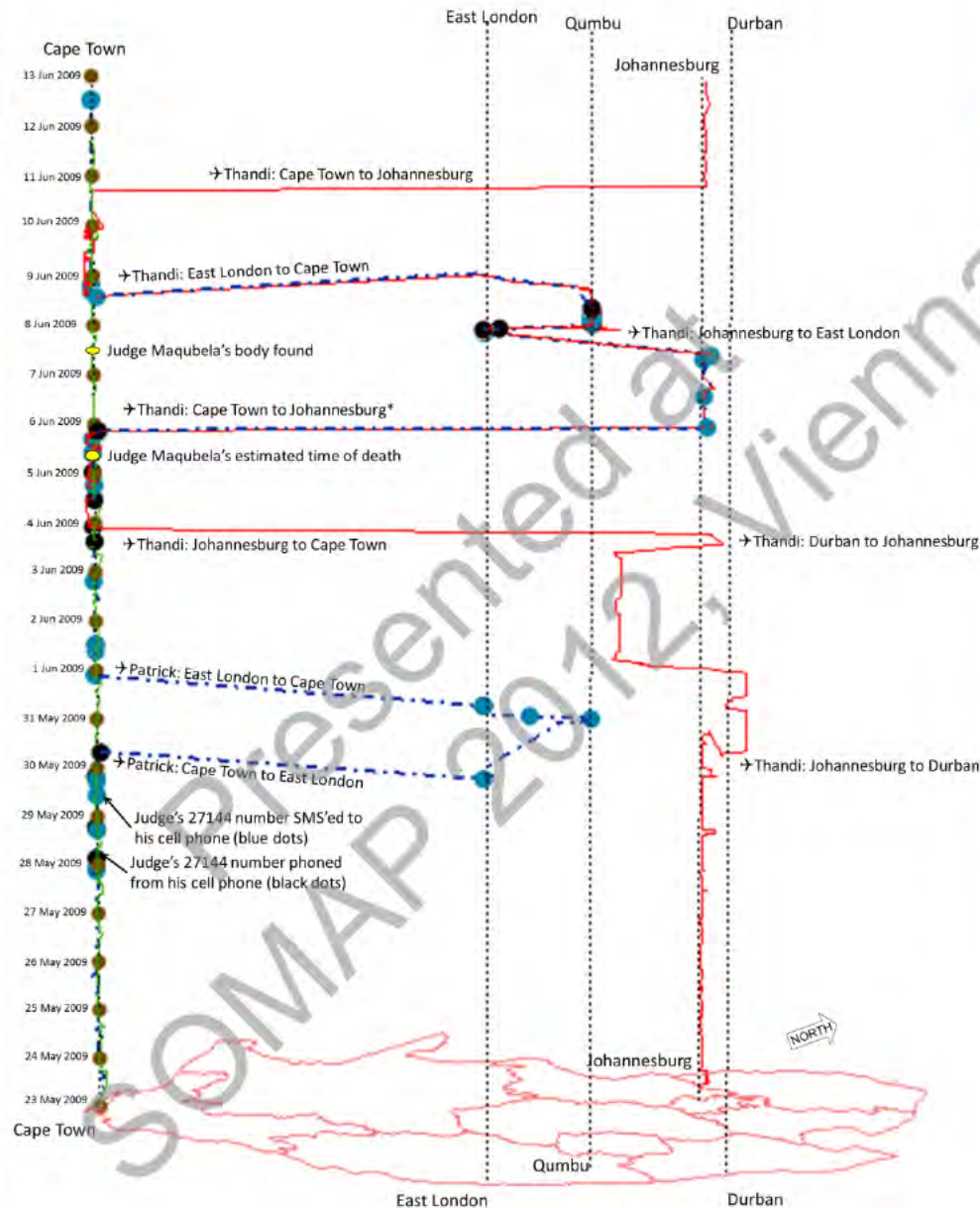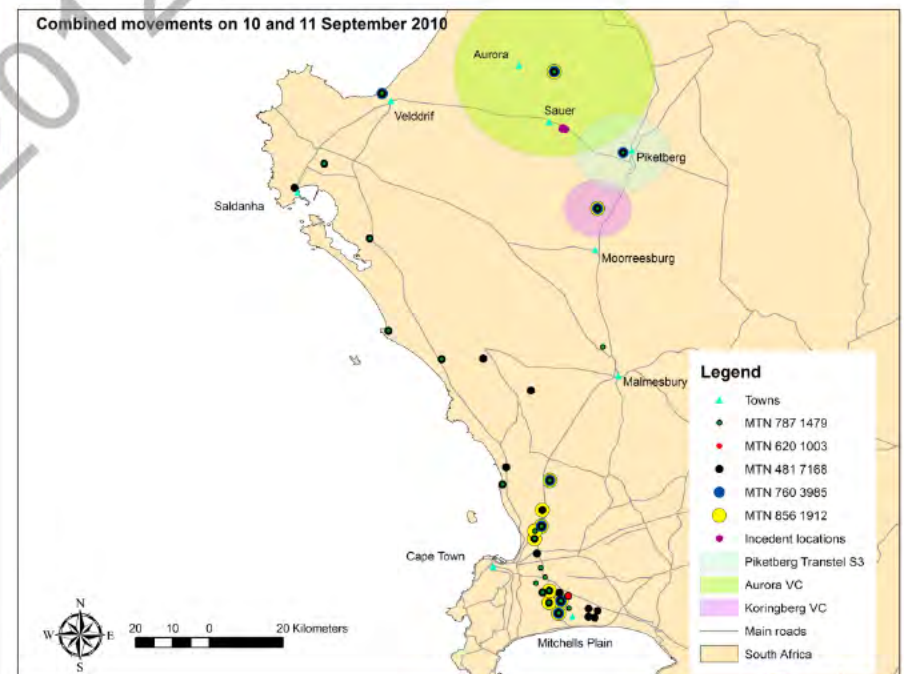
* Judge's cell phone on same flight, car, etc. See overlap of dot-dash blue line with Thandi's red line.

Combined movements on 20 September 2010

Combined movements on 10 and 11 September 2010

Conclusion

- Strategic, operational and tactical crime maps can be distributed to police stations and officers using WMS such as MapServer.
- Data collected by police officers on patrol can be uploaded to a server via web applications using WFS such as GeoServer.
- Data required in the creation of the aforementioned maps as well as the creation of forensic maps can be downloaded from the server using WFS.

- The biggest challenge however is to convince the South African Police Service to go the OpenSource route.

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Thank you

Wiener Graffiti