Drones, GIS and crime: Opportunities and challenges

Prof Gregory Breetzke

18/11/2016

Make today matter

Faculty of Natural and Agricultural Sciences

Fakulteit Natuur- en Landbouwetenskappe
Lefapha la Disaense tša Tlhago le Temo

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Overview

- My background

- Opportunities

- Challenges

- Questions
    - Who benefits?
    - Whose mandate?
    - What does the future hold?

- Final observations

My background

- Lecturer (University of Pretoria) (2008-2009)
- Lecturer- Senior Lecturer (University of Canterbury) (New Zealand) (2009-2014)

12:51pm, 22 February 2011

- Research Professor (UNISA) (2014-2016)
- Associate Professor (University of Pretoria) (2016-)

My background

- Environmental criminology
  - Spatial distribution of offenders and offences

- Spatial crime research
  - Crime and delinquency (patterns, distributions, associations, periodicity)
  - Crime, fear of crime, and health
  - Crime and alcohol

- Consultancy
  - South African Police Services
  - New Zealand Police
  - New Zealand Ministry of Health
  - New Zealand Ministry of Justice

…but first

"Scientists should be on tap, but not on top"

Winston Churchill (1964)

Opportunities

Active shooter

Hostage negotiation

Public unrest situations

Search operations

Crime surveillance and pursuit

Drug interdiction

Crime scene analysis

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Hostage standoff in Pretoria complex turns deadly

Sipho Mabena | 13 October, 2016 08:08

- 'Quadcopter'

- Biomimetic design

- Telepresence technology

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• ISS

• Facial recognition software

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Abducted Soweto toddler reunited with his mom after being found in KZN

October 28, 2016 — Julia Madibogo — 465 Views — KwaZulu-Natal, Mpande Khoza, Protea Glen, Siya Mlambo

- Cameras

- License-plate readers

- 'Real time intelligence'

Opportunities

Active shooter

Hostage negotiation

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Search operations

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Drug interdiction

Crime scene analysis

- Facial recognition software

- CCTV

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Melting snow being used by police to find cannabis farms in the Netherlands

Snow-free roofs can indicate the high temperatures needed to grow the drug

- Thermal cameras

- Spectroscopic sensors

- Cape Town experimenting

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Oscar cops accused of scene contamination

CRIME & COURTS / 20 February 2013, 2:46pm

PISTORIUS: HOW I KILLED REEVA

CRIME SCENE DO NOT CROSS

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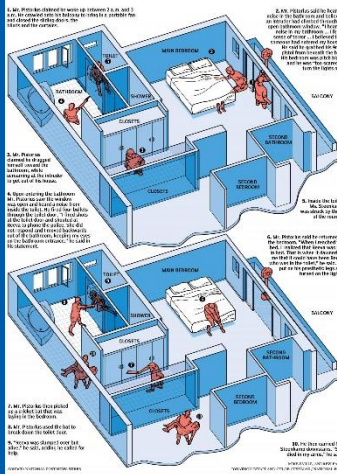
BUT WAIT....

Challenges

Regulatory and legal issues

Technical issues

Practical issues

Nature of crime

1. Should the SAPS obtain warrants to use UAVs where subjects have a reasonable expectation of privacy?

2. Should the SAPS retain images captured by UAVs if they are not relevant to a crime?

3. Should the SAPS give the public meaningful notice of UAV use?

4. Should the use of UAVs by the SAPS be subject to tracking and audits, with accountability for misuse?

5. Should the SAPS use weaponised UAVs?

Challenges

Regulatory and legal issues

Technical issues

Practical issues

Nature of crime

1. UAVs have operating limitations
   - height
   - time
   - speed
   - day/night

2. What to do with the data?

Challenges

Regulatory and legal issues

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Practical issues

Nature of crime

1. Cost

2. Training

3. Maintenance

4. CAASA regulations

5. Warrants (Time)?

6. Buy-in from national and local government

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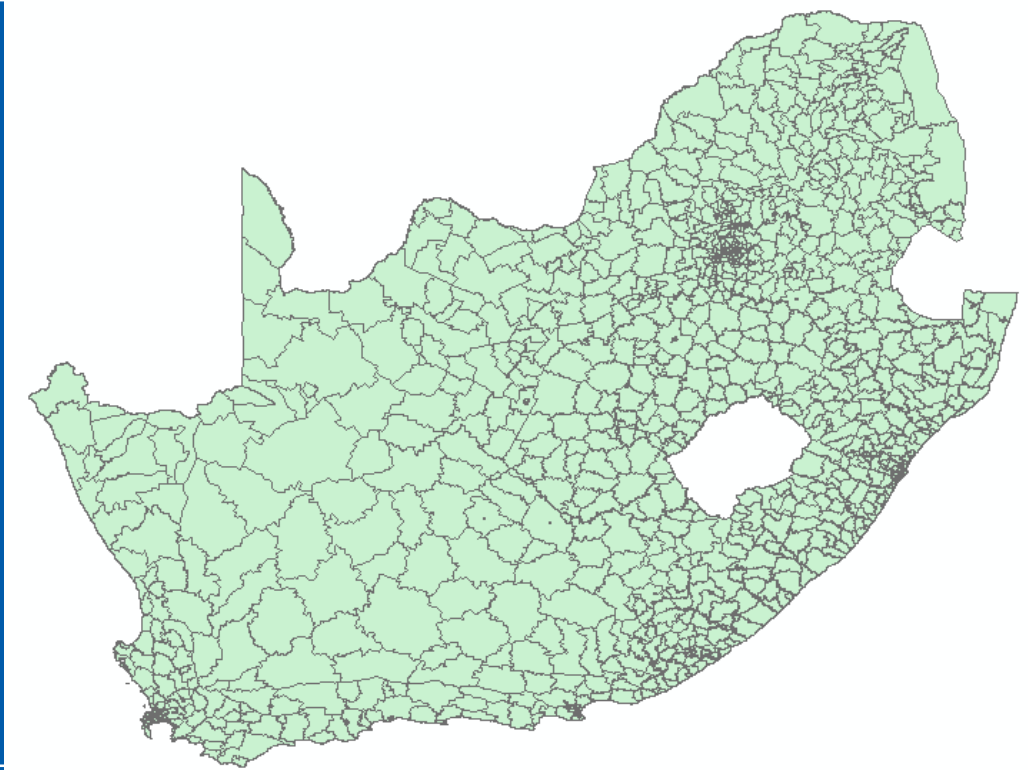
Challenges

1. Space

Regulatory and legal issues

Technical issues

Practical issues

Nature of crime
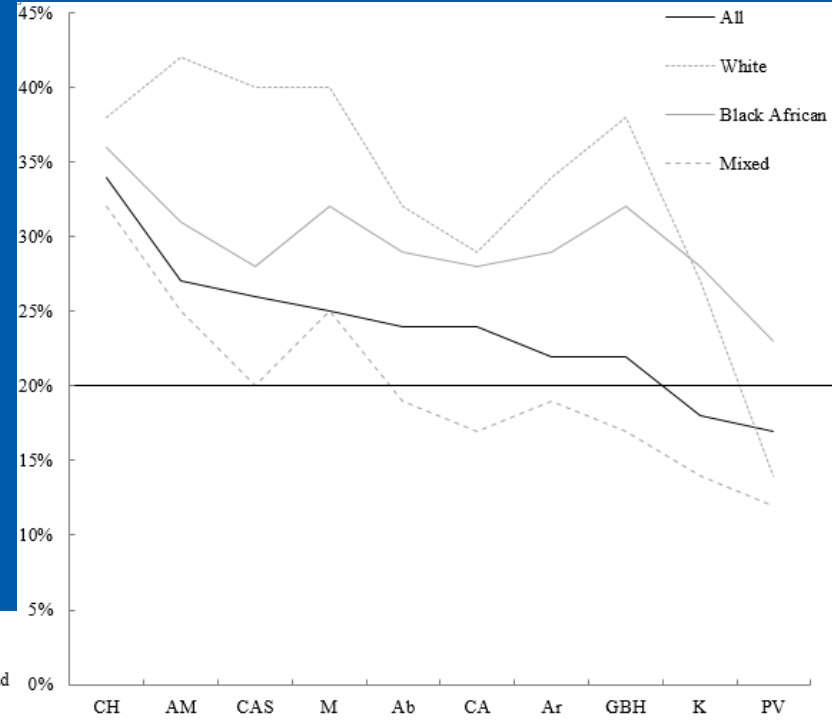
Application of the Pareto principle for violent crime in Tshwane

Note: CH: Culpable homicide; AM: Attempted murder; CAS: Common assault; M: Murder; Ab: Abduction; CA: Child abuse; Ar: Arson; GBH: Assault GBH; K: Kidnapping; PV: Public violence

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Challenges

Descriptive statistics of violent crime in Tshwane by neighborhood type (2002-2007)

	All neighborhoods (n = 353)			White neighborhoods (n = 113)			Black African neighborhoods (n = 136)			Mixed neighborhoods (n = 104)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
All violent crime	178509	505.7	1071.7	22813	201.9	230.3	103371	760.1	1268.4	52325	503.1	1253.8
Common assault	94342	267.3	620.4	15494	137.1	160.2	47058	346	697.4	31790	305.7	788.4
Assault GBH	62166	176.1	364.4	4513	39.9	48.9	42956	315.9	453.1	14697	141.3	367.1
Attempted murder	9171	26	53.9	1147	10.2	10.9	5964	43.9	74	2060	19.8	43.5
Murder	3765	10.7	22.9	324	2.9	3.1	2562	18.8	31.6	879	8.5	18
Culpable homicide	3038	8.6	16.7	644	5.7	6.3	1113	8.2	10.5	1281	12.3	27.2
Arson	2570	7.3	15.5	237	2.1	2.7	1758	12.9	20.6	575	5.5	13.4
Abduction	1522	4.3	9.6	212	1.9	2.5	788	5.8	9.5	522	5	13.4
Kidnapping	887	2.5	6.2	64	0.6	1	625	4.6	7.1	198	1.9	7.4
Child abuse	829	2.3	4.7	152	1.3	1.9	415	3.1	5.5	262	2.5	5.4
Public violence	219	0.6	1.5	26	0.2	0.5	132	1	1.9	61	0.6	1.5

Challenges

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Nature of crime

1. Space

2. Time

Challenges

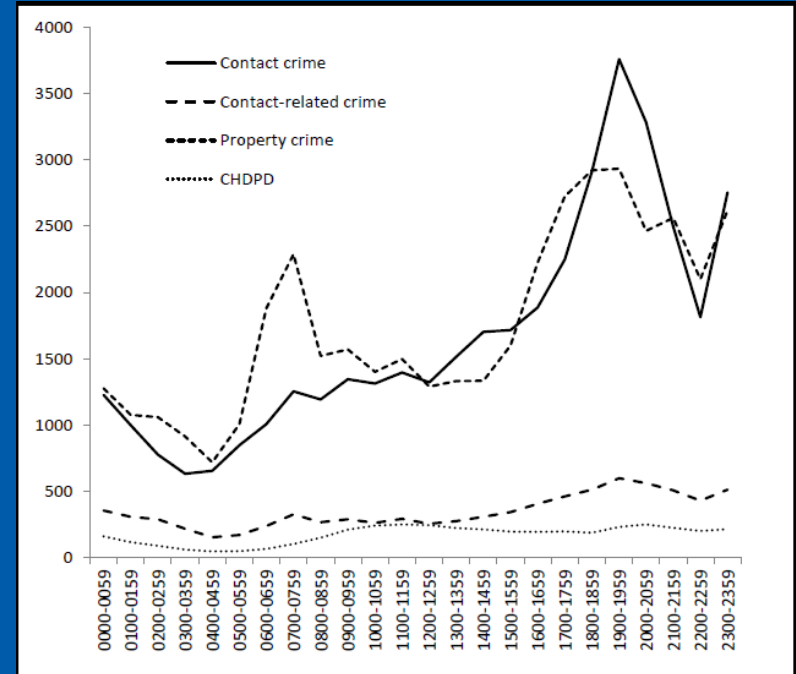Regulatory and legal issues

Technical issues

Practical issues

Nature of crime

1. Space

2. Time

3. Modus operandi

Who benefits?

- Who should benefit…?

- Who could benefit…?

- Who will benefit…?

- Who won't benefit…?

Who benefits?

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Whose mandate?

- South African Police Services (SAPS)?

- Private security companies?

- Private individuals?

"There is no reason for the city to bear the cost of keeping up with technology. There are research and development companies only too happy to test their technology in the real-world environment."

Arne Purves,
City of Cape Town's
environmental compliance
directorate

Drones over Cape Town could become a reality

CRIME & COURTS / 3 March 2016, 1:34pm

Lindsay Dentlinger

What does the future hold?
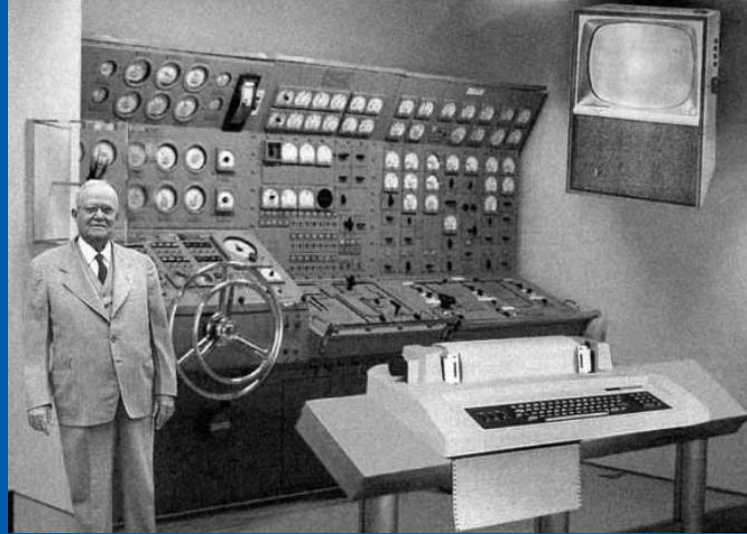
Scientists from the RAND Corporation have created this model to illustrate how a "home computer" could look like in the year 2004. However the needed technology will not be economically feasible for the average home. Also the scientists readily admit that the computer will require not yet invented technology to actually work, but 50 years from now scientific progress is expected to solve these problems. With teletype interface and the Fortran language, the computer will be easy to use.

Popular Mechanics (1954)
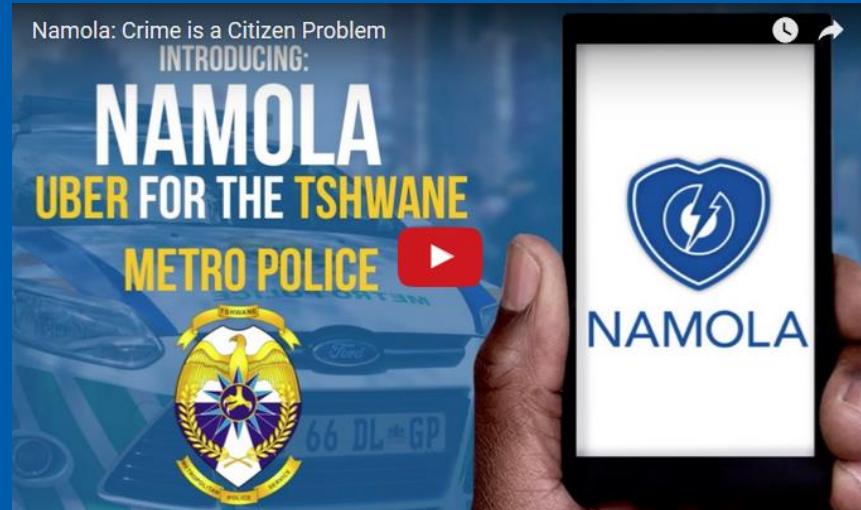
What does the future hold?

What does the future hold?

Namola: Crime is a Citizen Problem
INTRODUCING:
NAMOLA
UBER FOR THE TSHWANE METRO POLICE

An "Uber for police" has been launched in South Africa

http://namola.com/

What does the future hold?

Olaeris signs $55 million in orders for unmanned AEVA aircraft

Posted on July 18, 2016;

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Final observations

- Not going to reduce crime in South Africa

- Reactive crime prevention technique

- Niche market and application area

Thank You

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