Quality improvement of the Dutch cadastral map
and the surveying process

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Introduction

Subjects
- Cadastral map & day to day updating process (new boundaries)
- Field sketches
- Feasibility study to map improvement (better geometric quality)
- 2 goals: communication & do-it-yourself
- Automatic reading!
- Calculation process
Process cadastral updating
Cadastral map & field sketches

- Boundary = **invisible !!** outside, unless…
- Surveyor can show boundary outside: reconstruction
Feasibility study: “from good to better”
*increasing geometric quality and consistency*

Field Sheets
→ reconstruction
accurate & local relations

Cadastral Map
→ overview and relations
inaccurate & coordinates

“1 to 1 map”
→ reconstruction & viewer
accurate & coordinates
Measuring a new boundary

- combi of GPS, robotic totalstation and disto measurements
- yellow points constructed at the office, not in the field!
Goal 1: more transparency of quality

1-to-1 ! (never better!)

2015
σ = 2/2 cm

1-to-1 !

1832
σ = 40/40 cm

1930
σ = 20/5 cm

1976
σ = 20/5 cm

not yet 1-to-1 !

Assen C 1492
grt. = 820 m²
σ = 80/15 m²

Local dimension “3 tiles”

σ map / σ archive

Easy access to archive

Sparrenlaan

Not yet 1-to-1 !
Goal 2: Boundary information (Do It Yourself)

Costumer gets:
- “easy” local dimensions (own tape)
- accurate coordinates (hired GPS)
- additional info & instructions

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Betonnen mastvoet

Hoofdgebouw

picture?
Business case improved map

Benefits ...

- Surface determination directly from map
- Quality labels known
- Boundary reconstruction directly from map
- Consistency with topography/aerial imagery

Costs...

- Manual data extracting: astronomic costs!
- Automatic data extracting: the only way!?
In the past map was drawn directly out of field sketch instead of first ... Why?
Production of improved map
Proces of calculation of new map coordinates

1. Selection (in batch)
2. Reading & identification
3. Well-structured data
4. Combining
5. Calculation coordinates

Additional information:
1. Current CAD map
2. Topographic map
3. Photographs
4. Auto-fieldsketch
Production of improved map processing different types of information

- Kad krt.
  - Digital coordinates RDNA\textsubscript{P}trans
  - Additional fieldsketch
  - KAD 2 check with cadastral map
  - Place KAD 1 or DRA in map
  - Replacement boundary (KAD 2) by KAD 1 and construction of parcel
  - Reading & storing measurements & additional data
  - Identification of referencepoints

- TIR
  - Digital coordinates Local or “old” RD
  - Additional fieldsketch
  - KAD 2 check with cadastral map
  - transformation by .coo
  - Identification of referencepoints
  - Reading & storing measurements & additional data

- DRA
  - Analog coordinates
  - Local or “old” RD
  - Additional fieldsketch
  - KAD 2 check with cadastral map
  - transformation by .coo
  - Identification of referencepoints
  - Reading & storing measurements & additional data

- DVA
  - Analog coordinates
  - Local or “old” RD
  - Additional fieldsketch
  - KAD 2 check with cadastral map
  - transformation by .coo
  - Identification of referencepoints
  - Reading & storing measurements & additional data

- Rules connection points
- Identifcation of referencepoints
- Reading & storing measurements & additional data

- Historical fieldsketch/map with information gaps
  - Creating Auto-fieldsketch
  - Identification of referencepoints
  - Reading & storing measurements & additional data

- Biggest bottleneck: analog fieldsketches with local measurements

+/- 30 %
+/- 60 %
+/- 10 %
Production of improved map
At least 80% = important

1 when only recent measurements -> too fragmented (max. 20%)

2 when 80% or more is reached -> complete enough!
Additional information

Autofield sketch (simulated measurements!)
Case: field sketch
Assen 1974
Identification of connecting points (with other field sketches)
Extracted information: structure

Structure similar as example underneath

Automatic generating of point numbers is needed

not only measurements, but also geometric relations like intersection and collinearity (CL) have to be stored

MOVE3 V4.2.1 OBS file

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Expected result
Example connecting fieldsketches: current situation
Connecting fieldsketches (1910, nw boundary)

Intersection only in map!
Connecting fieldsketches (1930, nw boundary)
Connecting fieldsketches (1958: nw reference)
Connecting fieldsketches (1960, nw boundary)
Connecting fieldsketches (1980, nw boundary)
Connecting fieldsketches (all measurements!)
Process improvement by redesign:
Keyword is 100% digital

I am selling a piece of land

Deed creation
Temporary boundary

Preparation
Sign out the boundary
Measuring
Adjustment & testing
Creating parcels
Controle

Legal security

Notary

External party