SADL

Agiv

Impact analysis of a new Belgian ETRS89 based coordinate reference system (Lambert 2008) on the GI-community

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agenda

- AGIV?
- new coordinate reference system
- impact analysis
- results
- q&a

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AGIV

- Agency for Geographic Information Flanders

- government agency
- ca 115 people
- offices located in Ghent

AGIV

- mission statement: “to ensure the optimal use of geographical information in Flanders”
- legally founded in 1995
- part of GIS-Flanders cooperative
- core-business
  - administrator and central distributor of geographical reference data (1/250 – 1/500.000)
  - providing geoportal for Flanders and other on-line services
    - geo-portal (search – view – download)
    - FLEPOS (free of charge RTK GPS service for surveyors)
  - coordination of GDI-activitities in Flanders
    - INSPIRE / GDI-Flanders
    - strategic partnerships e.g. with utility companies, other regions and member states

next

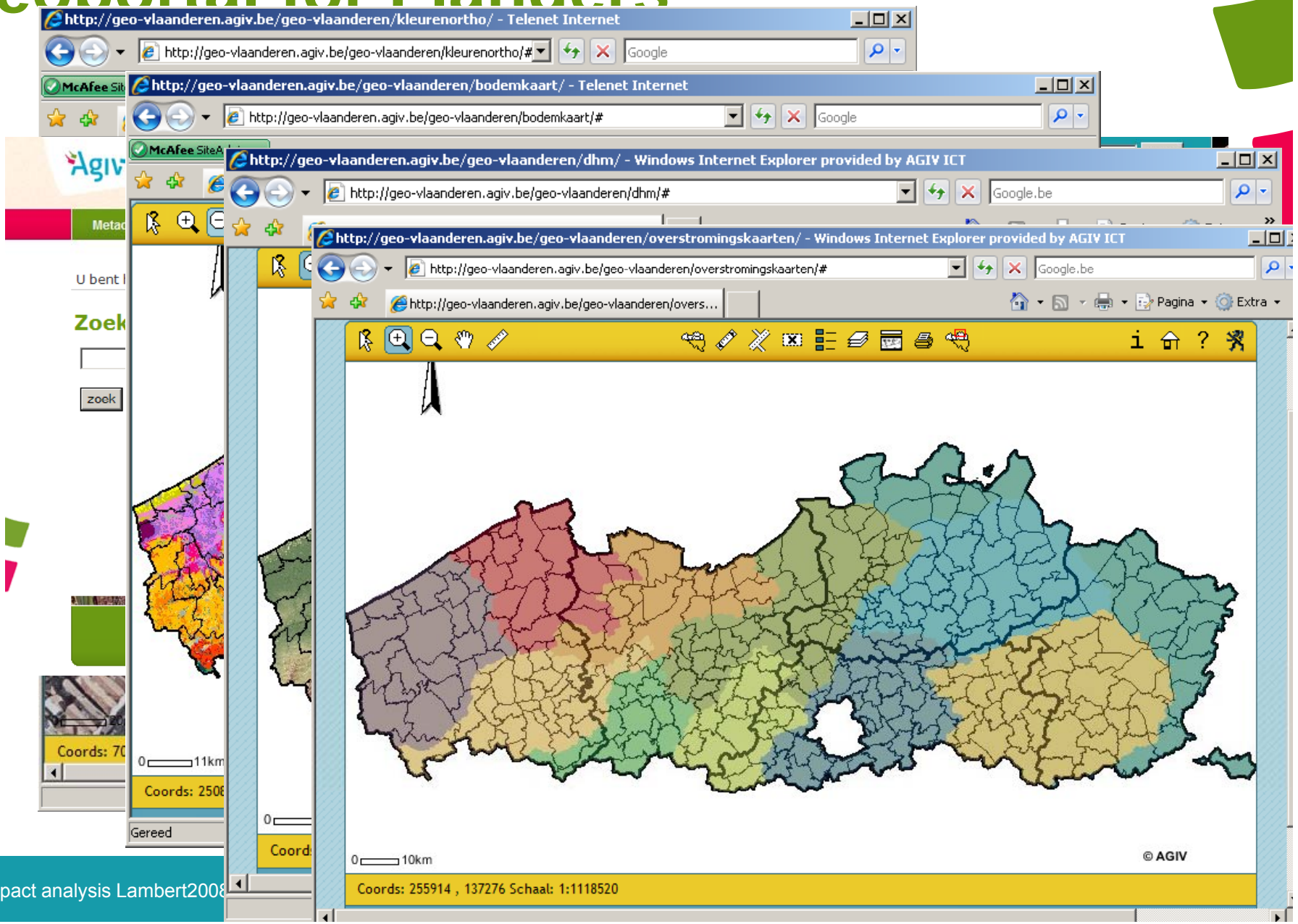
GRB – large scale reference database

- 63.000km roads
- 3 million addresses
- 2 million buildings
- 4,6 million parcels

in development between 2002-2014

some AGIV-products

geoportal for Flanders



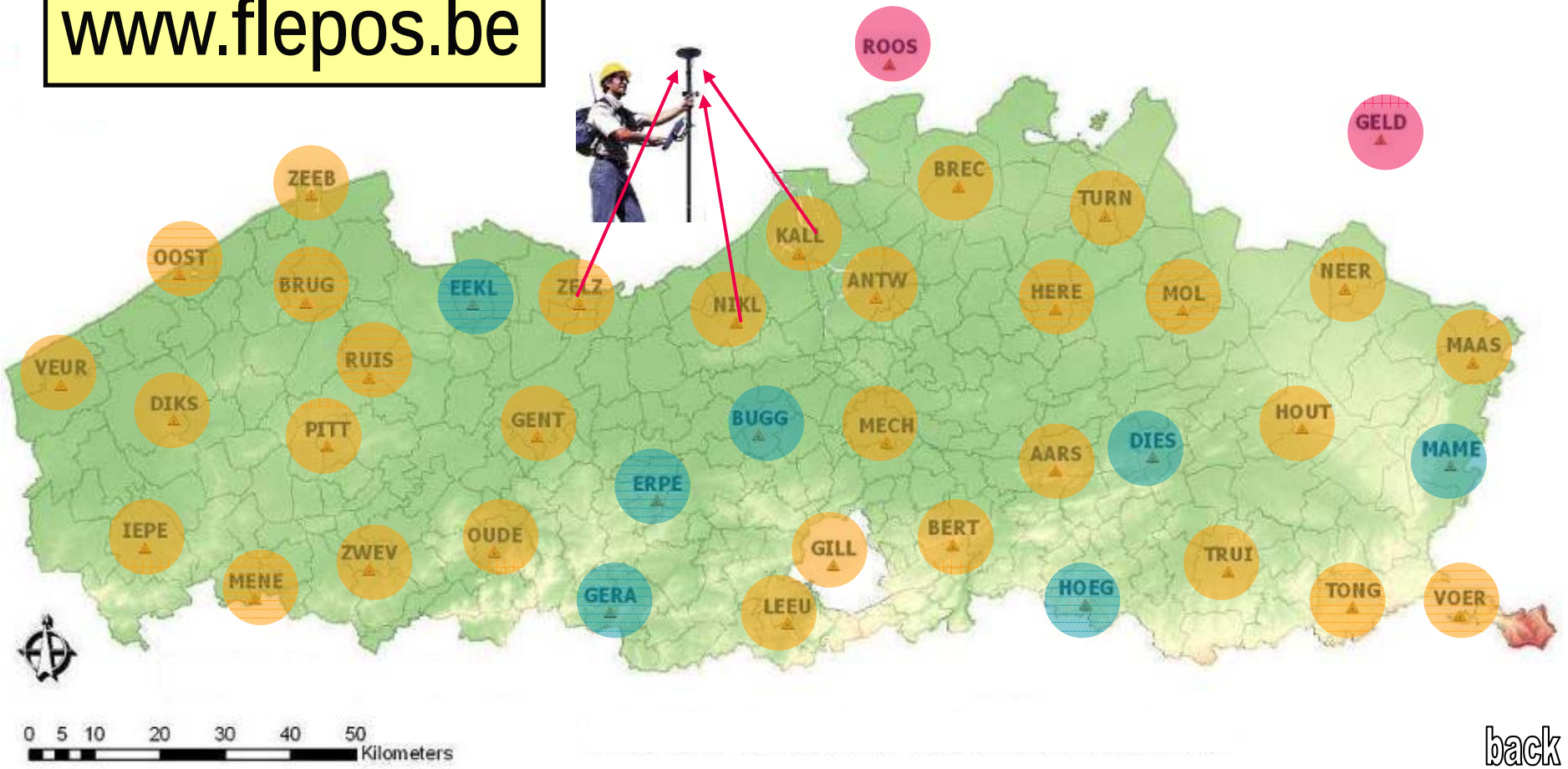
FLEPOS – Flemish Positioning Service

31 receivers on public buildings

7 stations on private buildings

-free of charge
- 99% reliability
- operates 38 GPS-stations
- baseline max. 20km
-NTRIP available
- specialized helpdesk
- > 100 users

www.flepos.be



back

relation with EUREF

- AGIV is very involved with possible changes of coordinate reference systems because
  - AGIV is the central administrator and distributor of a enormous amount of digital geographical information (e.g. large scale reference database - GRB)
  - exploits since 2002 a dense regionwide RTK GPS-network for surveyors (FLEPOS)
- AGIV is aware of the economical, technical and organisational impact of these changes

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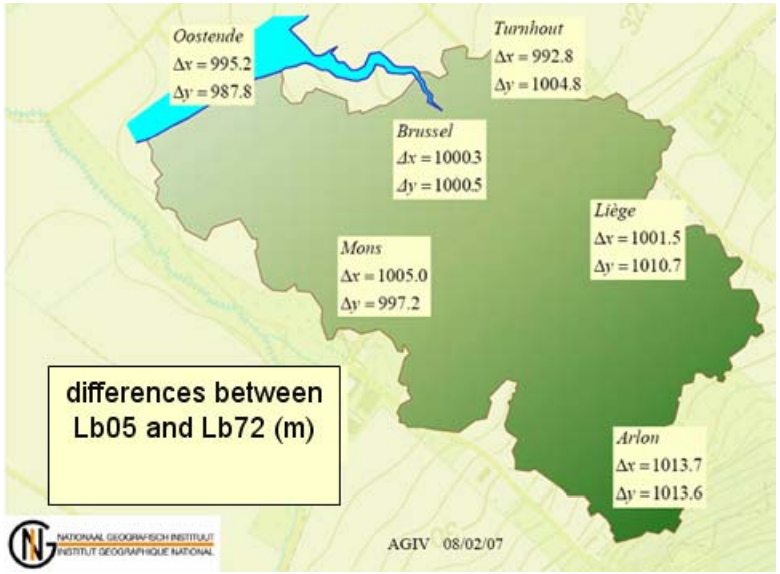
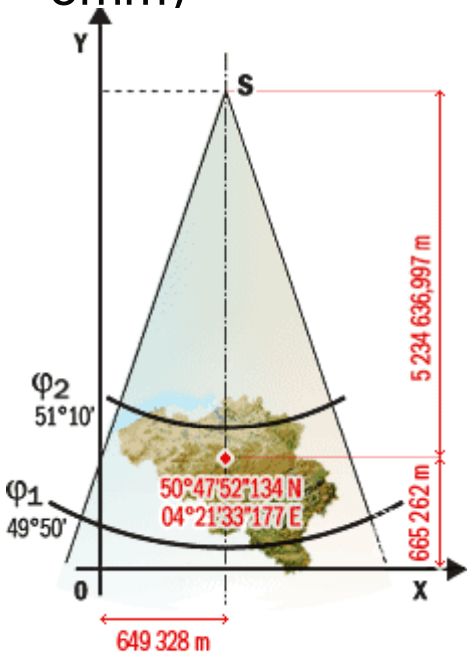
situation in 2006

- Lambert 1972 (Lb72) is the official Belgian map projection
  - mid/large scale geographical data
  - most GIS-data are stored in Lb72
- refers to BD72
- transformation between ETRS89 and BD72 is carried out by
  - 39 local sets of 7 parameters transformation (1993-2005)
  - one nationwide set of 7 parameters applied together with a correction grid (2005- present)

Lambert 2005 (Lb05)

- november 2006:
  - NGI decides Lb05 to be a new official map projection
  - existing Lambert 72 (Lb72) was kept
- Lb05 is a new Belgian coordinate reference system
  - based on 'BEREF'
  - ETRS89-densification (2002-campaign – σ = 5mm)
  - $\Delta_{Lb05\text{-}Lb72}$ = approx. 1km





figures © NGI

why Lambert 2005?

- to improve the accuracy of GPS-measurements when stored and presented in a geographical database or map
- to be compliant with INSPIRE – ETRS89 for international data-exchange - 'ESDI'
- transition ETRS89 ←→ Lb05 is less complex and easier to do

Lb05 is the logical next step, but...

- GI-community in Flanders and AGIV are concerned about the technical, economical and organisational impact since
  - the enormous amount of digital geographical information stored in Lb72
  - the fact that online GI plays a crucial role in many critical processes within public and private organisations
  - the fact that the large scale reference database (GRB) should be completed in 2014; changing the coordinate reference system in the middle of the development process may slow us down
- goal of the impact analysis of Lb05 is to describe the impact and make recommendations

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impact analysis: methodology (1)

- by Catholic University of Leuven (SADL), AGIV and supported by NGI
- 2006-2007
- 9 organisations were interviewed
  - 2 government (regional + local)
  - 3 utilitity companies (gas/electr. transport + distribution)
  - 2 private GI-related companies (software + data producer)
  - Tele Atlas (road database)
  - National Cadastre (AAPD)
- impact topics
  - technical impact (data, services, hard- and software,...)
  - organisational impact (ressources management,...)
  - financial impact (costs,...)
  - legal impact (e.g. contracts with data-producers,...)
  - indirect impact (e.g. promotion, communication,...)

impact analysis: methodology (2)

- multicriteria analysis of problems
  - technical
  - organisational
  - external
- recommendations - scenario study and assesment
- AGIV-case: detailed impact analysis of costs and benefits

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results from interviews

- big difference between interviewed bodies
- data scale & data-amount are related together with awareness of impact
- clear difference between data administrators or – producers and software developers
- utility companies are more concerned about (financial) impact then public organisations, despite both can be administrators of large amounts of geographical data at a large scale
- most organisations are asking/waiting for regional/national coordination to adopt Lb05
- most organisations prefer only one national coordinate reference system (Lb05 or Lb72) except in a temporarily transition phase

problem analysis (1)

- organisational problems (place, procedure, policy, personnel)
  - time to convert data
  - recuperation of costs (who pays for the bill?)
  - lack of competence within organisation
  - lack of metadata
- technical problems (materials, methods, means)
  - NGI offers softwaretools for conversion
  - conversion of large amounts of data is complex and requires specific procedures
  - different data formats require different procedures
  - difference of 1km between Lb05 and Lb72 is too small – mistakes are possible

problem analysis (2)

- external problems (customers, suppliers, politics, industry)
  - lack of national coordination
  - who is authorised to organise this

    - at the federal level?

    - at the regional level?

    - at the local level?
  - current processes can't be stopped, redundant systems are required to meet with customer demands
  - safety risk when 2 map projections can be used with differences of approx. 1km

AGIV-case

- how much would the adoption of Lb05 within AGIV-products and geo-portal cost?
  - initial conversion cost for AGIV is estimated at 536 kEUR
  - recurrent costs for AGIV (redundant systems and processes) is estimated at 75 kEUR per year
- benefits for AGIV
  - large scale reference database (GRB) is 12mm more accurate in plane in case of new GPS-based measurements
  - all reference data is directly compatible with ETRS89 without datum transformation
    - AGIV already has datum transformation services (BD72 ← → ETRS89)
    - INSPIRE-compatible

3 scenarios

- 1. GIS-Flanders/AGIV does not adopt Lb05
- 2. GIS-Flanders/AGIV adopts both Lb05 and Lb72
- 3. GIS-Flanders/AGIV adopts Lb05. Lb72 is only supported in a temporarily phase (e.g. 5 years)

- all scenarios require national coordination
- advisory bodies GIS-Flanders recommend
  - scenario 1 until the completion of the large scale reference database “GRB”
  - scenario 3 should be organised afterwards
- position of other regions in Belgium is important

Lambert 2008?

- september 2007 – impact analysis is finalized
  - since many interviewed organisations experienced the difference in coordinates (Lb72 <> Lb05) was (too) small (approx. 1km), NGI decided to replace Lb05 with a new map projection Lambert 2008 (Lb08)
  - Lb08 = Lb05 + 500km shift in origin

		Lambert 2005	**Lambert 2008**
Ellipsoïde	Naam	GRS80	GRS80
	½ grote as (a)	6.378.137 m	6.378.137 m
	Afplatting (f)	1/298,257222101	1/298,257222101
Standaard snijparalellen	φ1	49° 50' N	49° 50' N
	φ2	51° 10' N	51° 10' N
Oorsprong	Breedte oorsprong	50°47'52"134 N	50°47'52"134 N
	Centrale meridiaan	4°21'33"177 E	4°21'33"177 E
Verschuiving oorsprong	x_0	150.328,0 m	649.328,0 m
	y_0	166.262,0 m	665.262,0 m

  - all other conclusions in the study remain unchanged

conclusion

- impact analysis report gives a detailed overview of the many different sorts of problems changes in coordinate reference systems may cause nowadays for GI users
  - most technical issues can be solved
  - national coordination is needed anyhow
  - financial issues: who pays the bill?
  - completion of Flemish large scale reference database (GRB) in 2014 is a preferred moment for a general transition to Lb08

q&a

- thank you
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